

ASTRO PRODUCT CODE # 1004300



Product name:	n-Butanol
MSDS number:	18
Material number:	80018
Published date:	02/16/2007

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Product: n-Butanol
MSDS number: 18
Material number: 80018

Manufacturer, importer, supplier:

OXEA Corporation
 1603 West LBJ Freeway
 Dallas, TX 75234

Transportation emergency phone numbers:

In USA, call 800 424 9300
 Outside USA, call 703 527 3887, collect calls accepted

Product Information

Product Stewardship
 FAX: +49 (0)208 693 2053
 email: psq@oxea-chemicals.com

Synonyms: 1-Butanol; Butanol-1; Normal butanol; n-Propyl carbinol; Butyric alcohol;
 1-Hydroxybutane; Butyl alcohol.

2. Composition / Information on Ingredients

Component	CAS Number	Percent %	OSHA hazard category:
N-BUTANOL	71-36-3	99.8	Hazardous

3. Hazards Identification

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3. Hazards Identification

Emergency Overview:

WARNING!

- Flammable liquid and vapor.
- Causes eye irritation.
- May cause respiratory tract and skin irritation.
- May be harmful if swallowed.
- Vapor is heavier than air and can travel considerable distance to a source of ignition and flashback.

Product Description

Appearance: Clear, colorless mobile liquid.
Odor: Mild alcohol odor.

Potential health effects

Routes of exposure: Skin, eyes, inhalation, ingestion.

Immediate effects:

Skin: May cause skin irritation. Symptoms of exposure may include: Crusting, scaling, weeping and itching of skin.

Eyes: Exposure to vapors and liquid Causes eye irritation. Symptoms of exposure may include: Eye irritation, burning sensation, pain, watering, and/or change of vision.

Inhalation: May cause respiratory tract irritation. Harmful if inhaled. Symptoms of exposure may include: Nasal discharge, hoarseness, coughing, chest pain and breathing difficulty. Nausea, headache and/or dizziness.

Ingestion: May be harmful if swallowed. Symptoms of exposure may include: Nausea, vomiting, loss of appetite, gastrointestinal irritation and/or diarrhea. Central nervous system depression with nausea, headache and mental sluggishness.

Mutagenic: Does not show mutagenic potential in most in vitro tests.

Teratogenic: May cause birth defects based on animal data.

Target organ effects:

- Overexposure (prolonged or repeated exposure) may cause:
 - Central nervous system depression
 - Injury to the eyes
 - Irritation of the respiratory tract
 - Irritation of the digestive tract
 - Drying of the skin

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Medical conditions which may be aggravated by exposure: Significant exposure to this chemical may adversely affect people with acute or chronic disease of the:
Respiratory Tract
Skin
Eyes
Central nervous system

For further information, see: Section 4 - First Aid Measures
Section 5 - Fire Fighting Measures
Section 6 - Accidental Release Measures
Section 8 - Exposure Controls/Personal Protection
Section 9 - Physical and Chemical Properties
Section 10 - Stability and Reactivity

4. First Aid Measures

Skin: Immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Call a physician if irritation develops and persists. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses, if worn. Get medical attention immediately.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion: If large quantities of this material are swallowed, call a physician immediately. Induce vomiting immediately, as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

5. Fire Fighting Measures

NFPA: Health: 1 Flammability: 3 Reactivity: 0

Flammable properties

Flash point (test method): 37 C (98.6 F) (Closed Cup)

Flammable limits in air, % by volume:

Upper: 11.25%
Lower: 1.45%

Autoignition temperature: 365 C (689 F)

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Products of combustion:	Carbon Monoxide.

Extinguishing Media: Use CO₂ or dry chemical for small fires. Use aqueous film forming foam for large fires.

Fire Fighting Instructions: Water may be ineffective but should be used to cool fire-exposed structures and vessels. Use water spray for large fires. Keep personnel removed from and upwind of fire. If potential for exposure to vapors or products of combustion exists, wear full fire fighting turnout gear and NIOSH approved self-contained breathing apparatus. Oxidizing chemicals may accelerate the burning rate in a fire situation. Vapor is heavier than air and can travel considerable distance to a source of ignition and flashback.

Fire Fighting Environmental Concerns: Thoroughly decontaminate bunker gear and other fire-fighting equipment before re-use.

6. Accidental Release Measures

Spill or Leak Instructions

Eliminate ignition sources. See Section 8 for appropriate personal protective equipment. Contain spill with dikes of soil or nonflammable absorbent to minimize contaminated area. If fire potential exists, blanket spill with alcohol type aqueous film-forming foam or use water fog stream to disperse vapors. Avoid run-off into storm sewers and ditches leading to waterways. If required, notify state and local authorities. Place leaking containers in well-ventilated area. Clean up small spills by using a nonflammable absorbent or flushing sparingly with water. Contain larger spills with nonflammable diking or absorbent. Clean up by vacuuming or sweeping.

Within the United States, call the National Response Center (800-424-8802) and appropriate state and local authorities if the quantity released over 24 hours is equal to or greater than the reportable quantity listed below:
5,000 lbs. of the material as is, based on a Reportable Quantity of 5,000 lbs. for n-butanol.

Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. Isolate for 800 meters or 0.5 miles in all directions if tank, rail car, or tank truck is involved in fire. Material creates a special hazard because it floats on water. Evacuate downwind areas as conditions warrant to prevent exposure and to allow vapors or fumes to dissipate. Spills may expose downwind areas to toxic or flammable concentrations over considerable distances in some cases.

7. Handling and Storage

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7. Handling and Storage

Handling:

Use with adequate ventilation. Keep containers closed when not in use. Always open containers slowly to allow any excess pressure to vent. Avoid breathing vapor. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Decontaminate soiled clothing thoroughly before re-use. Destroy contaminated leather clothing.

This product may generate a static charge. Ground/bond equipment when transferring material to prevent static accumulation. Electrical equipment and circuits in all storage and handling must conform to requirements of National Electric Code (Article 500 and 501) for hazardous location.

Storage:

Keep all containers tightly closed when not in use. Store out of direct sunlight and on an impermeable floor. Do not store with incompatible materials. See Section 10. Stability and Reactivity.

8. Exposure Controls / Personal Protection

Engineering Controls:

General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Protective Equipment

A safety shower and eyebath should be readily available.

Skin protection:

Wear impervious clothing and gloves to prevent contact. Neoprene is recommended. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Eye/face protection:

Wear chemical goggles when there is a reasonable chance of eye contact.

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Respiratory protection: Based on workplace contaminant level and working limits of the respirator, use a respirator approved by NIOSH. The following is the minimum recommended equipment for an occupational exposure level. To estimate an occupational exposure level see Section 3, Section 8 and Section 11.

For concentrations > 1 and < 10 times the occupational exposure level: Use air-purifying respirator with full facepiece and organic vapor cartridge(s) or air-purifying full facepiece respirator with an organic vapor canister or a full facepiece powered air-purifying respirator fitted with organic vapor cartridge(s). The air purifying element must have an end of service life indicator, or a documented change out schedule must be established. Otherwise, use supplied air.

For concentrations more than 10 times the occupational exposure level and less than the lower of either 100 times the occupational exposure level or the IDLH: Use Type C full facepiece supplied-air respirator operated in positive-pressure or continuous-flow mode.

For concentrations > 100 times the occupational exposure level or greater than the IDLH level or unknown concentrations (such as in emergencies): Use self-contained breathing apparatus with full facepiece in positive-pressure mode or Type C positive-pressure full facepiece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus escape system.

For escape: Use self-contained breathing apparatus with full facepiece or any respirator specifically approved for escape.

Exposure guidelines

Component	CAS Number	Percent %	ACGIH TWA	ACGIH STEL	ACGIH CEILING	OSHA TWA	OSHA STEL	OSHA CEILING	Celanese WEL *	Mexico TWA	Mexico STEL	Mexico CEILING
N-BUTANOL	71-36-3	99.8	20 PPM	-	-	100 ppm	-	-	-	50 ppm	-	-

Component	CAS Number	Percent %	1990 NIOSH IDLH (Recognized by OSHA)	1994 NIOSH IDLH
N-BUTANOL	71-36-3	99.8	8000 ppm	1400 ppm

Comments: Celanese has adopted the ACGIH TLVs

9. Physical and Chemical Properties

Appearance: Clear, colorless mobile liquid.

Odor: Mild alcohol odor.

Vapor Pressure: 5.5 mm Hg at 25 deg C

Vapor Density (Air=1 @ 20°C): 2.57

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Boiling Point (760 mmHgA):	117.2 C (243 F)
Freezing Point:	-89.5 C (-129.1 F)
Specific Gravity:	0.8098 at 20 deg C
Molecular Weight:	74.12
Evaporation Rate (n-Butyl acetate = 1):	0.46

10. Stability and Reactivity

Stability:	Stable.
Conditions to Avoid:	Avoid heat, flames, sparks, and other sources of ignition.
Incompatibility:	Keep away from sulfuric and other strong inorganic acids, aluminum or lead (including equipment made of these metals), and oxidizing agents such as peroxides, nitric acid, perchloric acid or chromium trioxide.
Hazardous Combustion or Decomposition Products:	Thermal decomposition products may include oxides of carbon.
Hazardous Polymerization:	Hazardous polymerization will not occur.

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11. Toxicological Information

Component Toxicological Information

Component	N-BUTANOL
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Acute Exposure:

Oral LD50: 0.79-4.36 g/kg (rats); slightly toxic to animals.

Inhalation LC50: > 8000 ppm (rats, 4 hours); practically nontoxic to animals.

Skin: Moderately irritating to rabbit skin; slightly toxic to animals (LD50, rabbits: 3.4 - 5.3 g/kg).

Eyes: Severely irritating to rabbit eyes.

Mutagenicity: Not mutagenic in most *in vitro* assays (e.g., Ames test, SCE & micronucleus assays with Chinese hamster cells).

Carcinogenicity: No information.

Reproductive/Developmental Effects: In an inhalation developmental toxicity study, rats were exposed 7 hrs/day to 0, 3500, 6000 or 8000 ppm. Maternal toxicity and fetotoxicity were observed at 6000 and 8000 ppm. A slight increase in skeletal abnormalities was observed at 8000 ppm, a dose which caused 10% maternal mortality. The no effect concentration for developmental toxicity was 3500 ppm. In a behavioral teratology study, rats were exposed 7 hrs/day to 0, 3000 or 6000 ppm butanol. Significant effects were not observed.

Repeated Exposure: Rats were exposed orally via gavage to doses of 0, 30, 125, and 500 mg/kg/day for 13 weeks. CNS effects were observed in the high dose animals during the final 6 weeks of dosing. The no observed adverse effect level was 125 mg/kg/day. In a research study, oral exposure of rats to 6.9% butanol in drinking water for 3 months affected liver mitochondria.

12. Ecological Information

Component Ecological Information

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Component	N-BUTANOL
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Ecotoxicity: n-Butanol exhibits low acute toxicity to aquatic species. The 24-, 48- and 96-hour LC50 values for various fish species (Medaka, Golden Orfe, creek chub, fathead minnow, goldfish and bleak) range from 500 to 2300 ppm. The 48-hour EC50 for the water flea (daphnid) is 1983 ppm; for brine shrimp the LC50 is 2950 ppm. The 48-hour EC50 for protozoa is 2466 ppm. The toxicity thresholds for the alga *Scenedesmus quadricauda* and for cyanobacteria are 95-875 ppm and 100-312 ppm, respectively. Cell multiplication was inhibited for *Entosiphon sulcatum* (euglenoid) at 55 ppm after 72 hours. The 48-hour LC50 for *Xenopus laevis* (clawed toad) is 1200 ppm.

Environmental Fate:

Degradation: Under aerobic conditions butanol is readily biodegradable. The BOD (5-day)/COD ratio ranges from 0.42 - 0.74. In the Zahn-Wellens Test, 93-95% biodegradation was reported in 5 days. Atmospheric photochemical degradation is expected to range from 5 hours (in a sunlit urban atmosphere) to 2.3 days. Volatilization half-lives in water are estimated to be 2.4 hours, 3.9 hours, and 125.9 days in model streams, rivers and lakes, respectively.

Bioaccumulation: The calculated bioconcentration factor for goldfish is 0.62-0.67. The log n-octanol/water partition coefficient for n-butanol is 0.88. This suggests that butanol has low potential to bioaccumulate.

13. Disposal Considerations

Dispose of spilled material in accordance with state and local regulations for hazardous waste. Recommended methods are incineration or biological treatment at a federally or state-permitted disposal facility. Note that this information applies to the material as manufactured; processing, use, or contamination may make this information inappropriate, inaccurate, or incomplete.

Note that this handling and disposal information may also apply to empty containers, liners and rinsate. State or local regulations or restrictions are complex and may differ from federal regulations. This information is intended as an aid to proper handling and disposal; the final responsibility for handling and disposal is with the owner of the waste. See Section 9 - Physical and Chemical Properties.

EPA Hazardous Waste Code(s): U031

14. Transport Information

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14. Transport Information**US Department of Transportation:**

UN/NA Number: UN 1120
 Shipping name: BUTANOLS
 Hazard class: 3
 Packing Group: PG III
 DOT Reportable Quantity (RQ): 5000 lbs/2270 kg (1-Butanol)
 Emergency Response Guide: 129

ICAO/IATA:

IATA UN Number: UN 1120
 Proper Shipping Name: BUTANOLS
 Hazard Classification: 3
 Packing group: III
 Label: (Flammable Liquid)

IMDG:

International Marine UN Number: UN 1120
 Proper Shipping Name: BUTANOLS
 Hazard Class: 3
 Packing Group: III
 Flash point (test method): 37 C (98.6 F) (Closed Cup)

Transport Canada

Proper Shipping Name: Butanols
 Packing Group: III

Trade Information

Schedule B Code (export): 2905.13.0000

15. Regulatory Information**U.S. STATE REGULATIONS**

Chemicals associated with the product which are subject to the state right-to-know regulations are listed along with the applicable state(s):

N-BUTANOL 71-36-3

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N-BUTANOL 71-36-3

Pennsylvania	Listed
New York	Listed
New Jersey	Listed
Massachusetts	Listed
Rhode Island	Listed

U.S. FEDERAL REGULATIONS

TSCA Inventory: We certify that all components are either on the TSCA inventory or qualify for an exemption.

N-BUTANOL 71-36-3

EPCRA (SARA Title III)	Listed
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Section 313

GERCLA Hazardous Substance	Listed
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Acute health:	Yes
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Chronic health:	Yes
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Fire:	Yes
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Sudden release of pressure:	No
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Reactive:	No
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AUSTRALIA, CHINA, CANADA, EUROPE, KOREA, PHILIPPINES, JAPAN

CANADIAN REGULATIONS

WHMIS Classification: Class B, Division 2. Class D, Division 2, Subdivision B.

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

16 Other Information

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16. Other Information

Prepared by: Product Stewardship Department
Celanese Ltd.

Hazard ratings This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems.

NFPA: Health: 1 Flammability: 3 Reactivity: 0

HMIS: Health: 2 Flammability: 3 Reactivity: 0

Revisions: The following sections have been revised since the last issue of this MSDS.

1. Product and Company Identification

For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Celanese makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. This material may be released from gas, liquid, or solid materials made directly or indirectly from it. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards. Material safety data sheets are provided on the Internet by Celanese as a service to its customers. Possession of an Internet MSDS does not indicate that the possessor of the MSDS was a purchaser or user of the subject product.

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