

SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name: Eastman(TM) n-Butanol

Product No.: EAN 900050. P0004200

Synonyms, Trade Names: 00042-00

Additional identification

Chemical name: 1-butanol
CAS-No.: 71-36-3

Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Solvent

Uses advised against: None known.

Details of the supplier of the safety data sheet

Manufacturer / Supplier

Eastman Chemical Company
200 South Wilcox Drive
Kingsport, TN 37660-5280 US
+14232292000

Visit our website at www.EASTMAN.com or email emnmsds@eastman.com

Emergency telephone number:

For emergency health, safety, and environmental information, call 1-423-229-4511 or 1-423-229-2000.

For emergency transportation information, in the United States: call CHEMTREC at 800-424-9300 or call 423-229-2000.

SECTION 2: Hazards identification

Hazard classification:

Physical hazards

II Flammable liquids Category 3

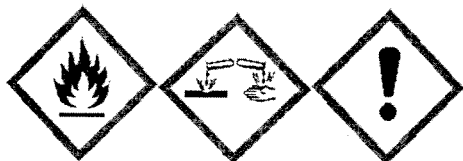
Health hazards

Acute toxicity (Oral) Category 4
Skin corrosion/irritation Category 2
Serious eye damage/eye irritation Category 1
Specific target organ toxicity - single exposure Category 3

OSHA Specified Hazards: not applicable

Warning label items including precautionary statement:

Pictogram:



- Signal words:** DANGER!
- Hazard Statement(s):** H226: Flammable liquid and vapor.
H302: Harmful if swallowed.
H315: Causes skin irritation.
H318: Causes serious eye damage.
H335: May cause respiratory irritation.
H336: May cause drowsiness or dizziness.
- Precautionary statement:**
- Prevention:** P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233: Keep container tightly closed.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ventilating/lighting/equipment.
P242: Use only non-sparking tools.
P243: Take precautionary measures against static discharge.
P280b: Wear protective gloves/eye protection/face protection.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P271: Use only outdoors or in a well-ventilated area.
- Response:** P370+P378: In case of fire; Use water spray, carbon dioxide, dry chemical or alcohol foam for extinction.
P303+P361+P353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P332+P313: If skin irritation occurs: Get medical advice/attention.
P362: Take off contaminated clothing and wash before reuse.
P301+P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330: Rinse mouth.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to remove. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor/physician.
P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312: Call a POISON CENTER or doctor/physician if you feel unwell.
- Storage:** P403+P233: Store in a well-ventilated place. Keep container tightly closed.
P235: Keep cool.
P405: Store locked up.
- Disposal:** P501: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC): None known.

SECTION 3: Composition/information on ingredients

Substances / Mixtures

General information:

Chemical name	Concentration	Additional identification	Notes
1-butanol	100%	CAS-No.: 71-36-3	#

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

This substance has workplace exposure limit(s).

SECTION 4: First aid measures

Description of first aid measures

Inhalation: Move to fresh air. Treat symptomatically. Get medical attention if symptoms persist.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately.

Skin contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash contaminated clothing before reuse. Get medical attention. Destroy or thoroughly clean contaminated shoes.

Ingestion: Seek medical advice.

Most important symptoms and effects, both acute and delayed: May irritate and cause redness and pain. Narcotic effect.

Indication of any immediate medical attention and special treatment needed

Hazards: Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea.

Treatment: Treat symptomatically.

SECTION 5: Firefighting measures

General fire hazards: Flammable liquid and vapor.

Extinguishing media

Suitable extinguishing media: Water spray. Carbon Dioxide. Dry chemical. Alcohol foam.

Unsuitable extinguishing media: None known.

Special hazards arising from the substance or mixture: Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations.

Advice for firefighters

Special fire fighting procedures:

Use water spray to keep fire-exposed containers cool. Water may be ineffective in fighting the fire.

Special protective equipment for fire-fighters:

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Wear appropriate personal protective equipment.

Environmental precautions:

Avoid release to the environment.

Methods and material for containment and cleaning up:

Eliminate sources of ignition. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Large Spillages: Use water spray to disperse vapors and dilute spill to a nonflammable mixture. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

Notification Procedures:

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

SECTION 7: Handling and storage:

Precautions for safe handling:

Do not get in eyes. Avoid breathing high vapor concentrations. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Wash thoroughly after handling.

Conditions for safe storage, including any incompatibilities:

Keep container tightly closed and in a well-ventilated place.

Specific end use(s):

Solvent

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational exposure limits

Country specific exposure limits have not been established or are not applicable unless listed below.

Chemical name	Type	Exposure Limit values	Source
butan-1-ol; n-butanol	TWA	20 ppm	US. ACGIH Threshold Limit Values (01 2010)
	PEL	100 ppm 300 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)

Exposure controls

Appropriate engineering controls: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

General information: Eye bath. Washing facilities. Safety shower.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection: Wear chemical-resistant gloves, footwear, and protective clothing appropriate for the risk of exposure. Contact health and safety professional or manufacturer for specific information.

Other: No data available.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Hygiene measures: Observe good industrial hygiene practices.

Environmental Controls: No data available.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Physical State:	Liquid
Form:	Liquid
Color:	Colorless
Odor:	Alcohol
Odor Threshold:	0.83 ppm
pH:	No data available.
Freezing Point:	-89 °C
Boiling Point:	118 °C
Flash Point:	36 °C (Tagliabue Closed Cup)
Evaporation Rate:	0.5
Flammability (solid, gas):	No data available.
Flammability Limit - Upper (%)-:	11.3 %(V)
Flammability Limit - Lower (%)-:	1.5 %(V)
Vapor pressure:	7.3 hPa

Vapor density (air=1):	2.6
Specific Gravity:	0.81 (25 °C)
Solubility(ies)	
Solubility in Water:	Moderate
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	Pow: 7.6 log Pow: 0.88
Autoignition Temperature:	343 °C
Decomposition Temperature:	(DTA) No exotherm to boiling
Dynamic Viscosity:	3 mPa.s (20 °C)
Kinematic viscosity:	No data available.
Explosive properties:	No data available.
Oxidizing properties:	No data available.

SECTION 10: Stability and reactivity

Reactivity:	None known.
Chemical stability:	Stable
Possibility of hazardous reactions:	None known.
Conditions to avoid:	Heat, sparks, flames.
Incompatible materials:	Strong oxidizing agents.
Hazardous decomposition products:	Carbon Monoxide. Carbon Dioxide.

SECTION 11: Toxicological information**Information on likely routes of exposure**

Inhalation:	May cause respiratory irritation. May cause drowsiness or dizziness.
Ingestion:	Harmful if swallowed.
Skin contact:	Causes skin irritation.
Eye contact:	Causes serious eye damage.

Information on toxicological effects**Acute Toxicity****Oral**

Product:	No data available.
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Specified substance(s)

butan-1-ol; n-butanol	Oral LD-50: (Rat): 790 mg/kg
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Dermal

Product:	No data available.
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Specified substance(s) butan-1-ol; n-butanol	Dermal LD-50: (Rabbit): 5,620 mg/kg
Inhalation	
Product:	No data available.
Specified substance(s) butan-1-ol; n-butanol	LC50 (Rat, 4 h): > 17.9 mg/l
Repeated dose toxicity	
Product:	No data available.
Specified substance(s) butan-1-ol; n-butanol	No data available.
Skin corrosion/irritation:	
Product:	No data available.
Specified substance(s) butan-1-ol; n-butanol	(Rabbit, 24 h): moderate
Serious eye damage/eye irritation:	
Product:	No data available.
Specified substance(s) butan-1-ol; n-butanol	(Rabbit, 24 h): Strongly irritating.
Respiratory or skin sensitization:	
Product:	No data available.
Specified substance(s) butan-1-ol; n-butanol	No data available.
Mutagenicity	
In vitro	
Product:	No data available.
Specified substance(s) butan-1-ol; n-butanol	No data available.
In vivo	
Product:	No data available.
Specified substance(s) butan-1-ol; n-butanol	No data available.
Carcinogenicity	
Product:	No data available.
Specified substance(s) butan-1-ol; n-butanol	No data available.
Reproductive toxicity	
Product:	No data available.
Specified substance(s)	

butan-1-ol; n-butanol No data available.

Specific target organ toxicity - single exposure

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol No data available.

Specific target organ toxicity - repeated exposure

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol No data available.

Aspiration hazard

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol No data available.

Other adverse effects:

No data available.

SECTION 12: Ecological information**Toxicity****Acute toxicity****Fish**

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol LC-50 (Fathead Minnow, 96 h): 1,376 mg/l

Aquatic invertebrates

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol LC-50 (Water Flea, 48 h): 1,328 mg/l

Chronic Toxicity**Fish**

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol No data available.

Aquatic invertebrates

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol No data available.

Toxicity to Aquatic Plants

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol No data available.

Persistence and degradability

Biodegradation

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol No data available.

Biological Oxygen Demand:

Product No data available.

Specified substance(s)

butan-1-ol; n-butanol BOD-5: 1,710 mg/g
BOD-20: 1,890 mg/g

Chemical Oxygen Demand:

Product No data available.

Specified substance(s)

butan-1-ol; n-butanol 2,460 mg/g

BOD/COD ratio

Product No data available.

Specified substance(s)

butan-1-ol; n-butanol No data available.

Bioaccumulative potential

Product: No data available.

Specified substance(s)

butan-1-ol; n-butanol No data available.

Mobility in soil:

No data available.

Known or predicted distribution to environmental compartments

butan-1-ol; n-butanol No data available.

Results of PBT and vPvB assessment:

No data available.

butan-1-ol; n-butanol

No data available.

Other adverse effects:

No data available.

SECTION 13: Disposal considerations

Waste treatment methods

General information:

No data available.

Disposal methods:

Dispose of waste and residues in accordance with local authority requirements. Mix with compatible chemical which is less flammable and incinerate. Since emptied containers retain product residue, follow label warnings even after container is emptied. Residual vapors may explode on ignition; do not cut, drill, grind, or weld on or near this container.

SECTION 14: Transport information

Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

DOT

Reportable Quantity: 2,270 kg (1-butanol)

Possible Shipping Description(s):

UN 1120 Butanols 3 III

IMDG - International Maritime Dangerous Goods Code

Possible Shipping Description(s):

UN 1120 BUTANOLS 3 III

IATA

Possible Shipping Description(s):

UN 1120 Butanols 3 III

SECTION 15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture:

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

WHMIS (Canada) Status: controlled

WHMIS (Canada) Hazard Classification: B/2, D/2/B

SARA 311-312 Hazard Classification(s):

immediate (acute) health hazard

fire hazard

US EPCRA (SARA Title III) Section 313 - Toxic Chemical List

N-BUTANOL

OSHA: hazardous

TSCA (US Toxic Substances Control Act): This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act): This product is listed on the DSL or otherwise complies with CEPA new substance notification requirements.

AICS / NICNAS (Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme): This product is listed on AICS or otherwise complies with NICNAS.

MITI (Japanese Handbook of Existing and New Chemical Substances): This product is listed in the Handbook or has been approved in Japan by new substance notification.

ECL (Korean Toxic Substances Control Act): This product is listed on the Korean inventory or otherwise complies with the Korean Toxic Substances Control Act.KE-03867

Philippines Inventory (PICCS) : This product is listed on the Philippine Inventory or otherwise complies with PICCS.

Inventory of Existing Chemical Substances in China: All components of this product are listed on the Inventory of Existing Chemical Substances in China (IECSC).

SECTION 16: Other information

HMIS® Hazard Ratings: Health - 3, Flammability - 3, Chemical Reactivity - 0

HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

Revision Information: Not relevant.

Key literature references and sources for data: No data available.

Training information: No data available.

Issue date: 06/17/2014

SDS No.:

Disclaimer: This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.