

SAFETY DATA SHEET



n-Butanol

10420

Version / Revision

2 .00***

Supersedes Version

1 .00***

Revision Date

28-Apr-2015

Issuing date

08-May-2015

SECTION 1: Identification

1.1. Product identifier

Identification of the substance/preparation

n-Butanol

CAS-No

71-36-3

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

Use of the Substance / Preparation

Intermediate solvent

1.3. Details of the supplier of the safety data sheet

Supplier

OXEA Corporation
1505 West LBJ Freeway, Suite 400
Dallas, TX 75234
USA
Phone: +1 972 481 2700

Product Information

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

1.4. Emergency telephone number

Emergency telephone number in USA, call 800 424 9300
outside USA, call 703 527 3887, collect calls accepted
available 24/7***

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This substance is classified in accordance with paragraph (d) of §1910.1200 (GHS-US classification).***

Skin corrosion/irritation Category 2, H315***

Serious eye damage/eye irritation Category 1, H318***

Target Organ Systemic Toxicant - Single exposure Category 3, H335; Category 3, H336***

Flammable liquid Category 3, H226***

OSHA Specified Hazards

Not applicable.

2.2. Label elements

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Labeling according to §1910.1200 (GHS-US labeling).***

Hazard symbol(s) ***



Signal word

Danger***

Hazard statements

H226: Flammable liquid and vapor.
H315: Causes skin irritation.
H318: Causes serious eye damage.
H335: May cause respiratory irritation.
H336: May cause drowsiness or dizziness.***

Precautionary statements

Prevention

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. 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.
P261: Avoid breathing gas/mist/vapours.
P264: Wash hands thoroughly after handling.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.***

Response

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER/doctor.
P362 + P364: Take off contaminated clothing and wash it before reuse.***

Storage

P403 + P235: Store in a well-ventilated place. Keep cool.
P405: Store locked up.***

Disposal

P501: Dispose of contents/container in accordance with local regulation.***

2.3. Other hazards

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Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback
Vapours may form explosive mixture with air
Components of the product may be absorbed into the body by inhalation, ingestion and through the skin***

SECTION 3: Composition/information on ingredients

3.1. Substances

Component	CAS-No	Concentration (%)
Butan-1-ol	71-36-3	> 99,80

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation

Keep at rest. Aerate with fresh air. When symptoms persist or in all cases of doubt seek medical advice.

Eyes

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Immediate medical attention is required.

Skin

Wash off immediately with soap and plenty of water. When symptoms persist or in all cases of doubt seek medical advice.

Ingestion

Rinse mouth. Call a physician immediately. If conscious, drink plenty of water. Do not induce vomiting without medical advice.

4.2. Most important symptoms and effects, both acute and delayed

Main symptoms

cough, headache, dizziness, drowsiness, nausea, vomiting, abdominal pain, unconsciousness, diarrhea.

Special hazard

Lung irritation, Pneumonia.

4.3. Indication of any immediate medical attention and special treatment needed

General advice

Remove contaminated, soaked clothing immediately and dispose of safely. If unconscious place in recovery position and seek medical advice. First aider needs to protect himself.

Treat symptomatically. If ingested, irrigate the stomach using activated charcoal. Chemical pneumonitis could follow respiratory exposure.

SECTION 5: Firefighting measures

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5.1. Extinguishing media

Suitable extinguishing media

dry chemical, carbon dioxide (CO₂), water spray, alcohol-resistant foam

Extinguishing media which must not be used for safety reasons

Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Under conditions giving incomplete combustion, hazardous gases produced may consist of:

carbon monoxide (CO)

carbon dioxide (CO₂)

Combustion gases of organic materials must in principle be graded as inhalation poisons

Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback

Vapours may form explosive mixture with air

5.3. Advice for firefighters

Special protective equipment for firefighters

Fire fighter protection should include a self-contained breathing apparatus (NIOSH-approved or EN 133) and full fire-fighting turn out gear.

Precautions for firefighting

Cool containers / tanks with water spray. Dike and collect water used to fight fire. Keep people away from and upwind of fire. Do not allow run-off from fire fighting to enter drains or water courses. Foam should be applied in large quantities as it is broken down to some extent by the product.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid contact with skin and eyes. Avoid breathing vapors or mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. Keep away from heat and sources of ignition. For emergency responders: Personal protection see section 8.

6.2. Environmental precautions

Prevent further leakage or spillage. Do not discharge product into the aquatic environment without pretreatment (biological treatment plant).

6.3. Methods and material for containment and cleaning up

Methods for containment

Stop the flow of material, if possible without risk. Dike spilled material, where this is possible.

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Methods for cleaning up

Soak up with inert absorbent material (e.g. universal binder). Keep in suitable, closed containers for disposal. If liquid has been spilt in large quantities clean up promptly by scoop or vacuum. Dispose of in accordance with local regulations. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours).

6.4. Reference to other sections

For personal protective equipment see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Provide sufficient air exchange and/or exhaust in work rooms.

Hygiene measures

When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Advice on the protection of the environment

See Section 8: Environmental exposure controls.

Incompatible products

strong oxidizing agents

acids

acid chlorides

reducing agents

7.2. Conditions for safe storage, including any incompatibilities

Advice on protection against fire and explosion

Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). In case of fire, emergency cooling with water spray should be available. Ground and bond containers when transferring material. Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback. Vapours may form explosive mixture with air.

Technical measures/Storage conditions

Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care.

Suitable material

stainless steel, mild steel

Unsuitable material

Attacks some forms of plastic and rubber, Natural Rubber

SECTION 8: Exposure controls/personal protection

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8.1. Control parameters

Exposure limits United States of America

US ACGIH

Component	TWA (mg/m ³)	TWA (ppm)	STEL (mg/m ³)	STEL (ppm)
Butan-1-ol CAS: 71-36-3		20 ***		

US OSHA Z-1

Component	Ceiling (mg/m ³)	Ceiling (ppm)	PEL (mg/m ³)	PEL (ppm)	Skin Designation
Butan-1-ol CAS: 71-36-3			300***	100***	

Note

For details and further information please refer to the original regulation.

8.2. Exposure controls

Appropriate 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.

Individual protection measures, such as personal protective equipment

General industrial hygiene practice

Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Ensure that eyewash stations and safety showers are close to the workstation location.

Hygiene measures

When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Eye protection

Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.

Hand protection

Wear protective gloves. Recommendations are listed below. 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.

Suitable material	butyl-rubber
Evaluation	according to EN 374: level 6
Glove thickness	approx 0,3 mm
Break through time	> 480 min

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Suitable material	nitrile rubber
Evaluation	according to EN 374: level 6
Glove thickness	approx 0,55 mm
Break through time	> 480 min

Skin and body protection

Impervious clothing. Wear face-shield and protective suit for abnormal processing problems.

Respiratory protection

Respirator with filter for organic vapour. Use the indicated respiratory protection if the occupational exposure limit is exceeded and/or in case of product release (dust). Equipment should conform to NIOSH.

Environmental exposure controls

If possible use in closed systems. If leakage can not be prevented, the substance needs to be suck off at the emersion point, if possible without danger. Observe the exposure limits, clean exhaust air if needed. If recycling is not practicable, dispose of in compliance with local regulations. Inform the responsible authorities in case of leakage into the atmosphere, or of entry into waterways, soil or drains.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	liquid				
Colour	colourless				
Odour	alcoholic				
Odour threshold	No data available				
pH	neutral				
Melting point/range	< -130 °F (< -90 °C) (Pour point)				
Boiling point/range	246 °F (119 °C) @ 1 atm (101,3 kPa)				
Flash point	95 °F (35 °C)				
Method	ISO 2719				
Evaporation rate	No data available				
Flammability (solid, gas)	Does not apply, the substance is a liquid				
Lower explosion limit	1,4 Vol %				
Upper explosion limit	11,3 Vol %				
Vapour pressure	***				
Values	Values	Values	@ °C	@ °F	Method
[hPa]	[kPa]	[atm]			
10	1***	0,010***	20	68	
53	5,3***	0,052***	50	122	
Vapour density	2,6 (Air = 1) @ 20 °C (68 °F)				
Relative density	***				
Values	@ °C	@ °F	Method		
0,81	20	68	DIN 51757		
Solubility	No data available				
Water solubility	66 g/l @ 68 °F (20 °C) OECD 105				
log Pow	1 (measured) OECD 117				
Autoignition temperature	671 °F (355 °C)				

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Method	DIN 51794
Decomposition temperature	No data available
Viscosity	2,947 mPa*s @ 68 °F (20 °C)
Method	dynamic, DIN 51562

9.2. Other information

Molecular weight	74,12
Molecular formula	C4 H10 O
Oxidizing properties	Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties
Refractive Index	1,399 @ 68 °F (20 °C)
Explosive properties	Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties
Surface tension	69,9 mN/m (1 g/l @ 20°C), OECD 115

SECTION 10: Stability and reactivity

10.1. Reactivity

The reactivity of the product corresponds to the typical reactivity shown by the substance group as described in any text book on organic chemistry.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4. Conditions to avoid

Avoid contact with heat, sparks, open flame and static discharge. Avoid any source of ignition.

10.5. Incompatible materials

strong oxidizing agents, acids, acid chlorides, reducing agents.

10.6. Hazardous decomposition products

No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure Ingestion, Inhalation, Eye contact, Skin contact***

Butan-1-ol, CAS: 71-36-3

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Main symptoms

cough, headache, dizziness, drowsiness, nausea, vomiting, abdominal pain, unconsciousness, diarrhoea.

Target Organ Systemic Toxicant - Single exposure

The available data lead to the classification given in section 2***

Target Organ Systemic Toxicant - Repeated exposure

Based on available data, the classification criteria are not met for:

STOT RE***

Acute toxicity				
Butan-1-ol (71-36-3)				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	2292 mg/kg	rat, female	OECD 401
Inhalative	LC0	> 17,76 mg/l (4h)	rat, male/female	OECD 403
Dermal	LD50	3430 mg/kg	rabbit	OECD 402

Butan-1-ol, CAS: 71-36-3

Assessment

Based on available data, the classification criteria are not met for:

Acute oral toxicity

Acute dermal toxicity

Acute inhalation toxicity***

Irritation and corrosion				
Butan-1-ol (71-36-3)				
Target Organ Effects	Species	Result	Method	
Skin	rabbit	irritating	Draize Test	
Eyes	rabbit	severe irritation	OECD 405	

Butan-1-ol, CAS: 71-36-3

Assessment

The available data lead to the classification given in section 2***

Sensitization				
Butan-1-ol (71-36-3)				
Target Organ Effects	Species	Evaluation	Method	
Skin	guinea pig	not sensitizing	OECD 406	read across

Butan-1-ol, CAS: 71-36-3

Assessment

Based on available data, the classification criteria are not met for:

Skin sensitization

For respiratory sensitization, no data are available***

Subacute, subchronic and prolonged toxicity				
Butan-1-ol (71-36-3)				
Type	Dose	Species	Method	
Subchronic toxicity	NOAEL: 125 mg/kg/d	rat, male/female		Oral
Subchronic toxicity	LOAEL: 500 mg/kg/d	rat, male/female		Oral

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Subchronic toxicity	NOAEL: ~ 2,35 mg/l/d (90d)	rat, male/female	EPA OTS 798.2450	Inhalation
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Butan-1-ol, CAS: 71-36-3

Assessment

Based on available data, the classification criteria are not met for:
STOT RE***

Carcinogenicity, Mutagenicity, Reproductive toxicity					
Butan-1-ol (71-36-3)					
Type	Dose	Species	Evaluation	Method	
Mutagenicity		V79 cells, Chinese hamster	negative	OECD 476 (Mammalian Gene Mutation)	
Mutagenicity		V79 cells, Chinese hamster	negative	Chromosomal Aberration	
Mutagenicity		Salmonella typhimurium	negative	Ames test	
Mutagenicity		mouse	negative	OECD 474	Oral
Reproductive toxicity	NOAEL 18,5 mg/l	rat, parental			Inhalation
Reproductive toxicity	NOAEL 18,5 mg/l	rat, 1. Generation, male/female			Inhalation
Mutagenicity	NOAEL 5000 mg/kg/d	rat, female		Oral	
Developmental Toxicity	NOAEL 1454 mg/kg/d	rat		Oral	Maternal toxicity, Fetal toxicity
Developmental Toxicity	NOAEL 5654 mg/kg/d	rat		Oral	Teratogenicity
Developmental Toxicity	NOAEL 10,8 mg/l	rat		Inhalation	Maternal toxicity, Fetal toxicity
Developmental Toxicity	NOAEL 24,7 mg/l	rat		Inhalation	Teratogenicity

Butan-1-ol, CAS: 71-36-3

CMR Classification

The available data on CMR properties are summarized in the table above. They do not indicate a classification into categories 1A or 1B***

Evaluation

In vitro tests did not show mutagenic effects***

Butan-1-ol, CAS: 71-36-3

Aspiration toxicity

Based on the viscosity a potential aspiration hazard cannot be excluded

Other adverse effects

Components of the product may be absorbed into the body by inhalation, ingestion and through the skin.

Note

Handle in accordance with good industrial hygiene and safety practice. Further details on substance data can be found in the registration dossier under the following link: <http://apps.echa.europa.eu/registered/registered-sub.aspx>.***

SECTION 12: Ecological information

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12.1. Toxicity

Acute aquatic toxicity			
Butan-1-ol (71-36-3)			
Species	Exposure time	Dose	Method
Pimephales promelas (fathead minnow)	96h	LC50: 1376 mg/l	OECD 203
Daphnia magna (Water flea)	48h	EC50: 1328 mg/l	OECD 202
Pseudomonas putida	17 h	EC50: 4390 mg/l (Growth inhibition)	DIN 38412, part 8
Pseudokirchneriella subcapitata	96h	EC50: 225 mg/l (Growth rate)	OECD 201

Long term toxicity				
Butan-1-ol (71-36-3)				
Type	Species	Dose	Method	
Reproductive toxicity	Daphnia magna (Water flea)	NOEC: 4,1 mg/l (21d)	OECD 211	
Reproductive toxicity	Daphnia magna (Water flea)	EC50: 18 mg/l/21d	OECD 211	

12.2. Persistence and degradability

Butan-1-ol, CAS: 71-36-3

Biodegradation

92 % (15 d), Sewage, aerobic, domestic, non-adapted, BOD.

12.3. Bioaccumulative potential

log Pow 1 (measured) OECD 117

12.4. Mobility in soil

12.4. Mobility in soil		
Butan-1-ol (71-36-3)		
Type	Result	Method
Surface tension***	69,9 mN/m (1 g/l @ 20°C)***	OECD 115***

12.5 Other adverse effects

Butan-1-ol, CAS: 71-36-3

No data available***

Note

Avoid release to the environment.

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SECTION 13: Disposal considerations

Product Information

Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.

Uncleaned empty packaging

Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

SECTION 14: Transport information

D.O.T. (49CFR)

14.1. UN number	*** UN 1120
14.2. UN proper shipping name	*** Butanols
14.3. Transport hazard class(es)	*** 3
14.4. Packing group	*** III
14.5. Environmental hazards	no***
14.6. Special precautions for user	***
Reportable Quantity (RQ)	5000 lb/ 2270 kg (1-Butanol)
Emergency Response Guide	129

ICAO/IATA

14.1. UN number	*** UN 1120
14.2. UN proper shipping name	*** Butanols***
14.3. Transport hazard class(es)	*** 3
14.4. Packing group	*** III
14.5. Environmental hazards	no***
14.6. Special precautions for user	no data available***

IMDG

14.1. UN number	*** UN 1120
14.2. UN proper shipping name	*** Butanols***
14.3. Transport hazard class(es)	*** 3
14.4. Packing group	*** III
14.5. Environmental hazards	no***
14.6. Special precautions for user	***

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EmS

F-E, S-D

14.7. Transport in bulk according to Annex II *** of MARPOL73/78 and the IBC Code

Product name

n-Butyl alcohol

Pollution category

Z

SECTION 15: Regulatory information

Federal and State Regulations

Components of the product are listed in the quoted regulations. For details please refer to the regulations directly. This list is not exhaustive, please check for other applicable regulations.

Federal Regulations

This product is listed on the TSCA inventory

Butan-1-ol, CAS: 71-36-3

CERCLA Hazardous Substance***

CERCLA RQ 5000 LBS***

EPCRA SARA Title III 313***

de minimis concentration 1.0 %***

State Regulations

Butan-1-ol, CAS: 71-36-3

CA Hazardous Substances (Director's) List***

IL Chemical Safety Act***

MA RTK List***

MN Hazardous Substances List***

NJ RTK List***

PA RTK List***

RI RTK List***

International Inventories

Butan-1-ol, CAS: 71-36-3

AICS (AU)

DSL (CA)

IECSC (CN)

EC-No. 2007516 (EU)

ENCS (2)-3049 (JP)

ISHL (2)-3049 (JP)

ISHL 2-(8)-299 (JP)

KECI KE-03867 (KR)

INSQ (MX)***

PICCS (PH)

TSCA (US)

NZIoC (NZ)

TCSI (TW)***

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SECTION 16: Other information

Revision Date 28-Apr-2015
Issuing date 08-May-2015

Hazard Rating Systems

NFPA (National Fire Protection Association)

Health Hazard	2
Fire Hazard	3
Reactivity	0

HMS (Hazardous Material Information System)

Health Hazard	2
Flammability	3
Physical Hazard	0

Training advice

For effective first-aid, special training / education is needed.

Sources of key data used to compile the datasheet

Information contained in this safety data sheet is based on Oxea owned data and public sources deemed valid or acceptable. The absence of data elements required by ANSI or Annex II, Regulation 1907/2006/EC indicates, that no data meeting these requirements is available.

Further information for the safety data sheet

Changes against the previous version are marked by ***. Observe national and local legal requirements. For more information, other material safety data sheets or technical data sheets please consult the Oxea homepage (www.oxea-chemicals.com).

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End of Safety Data Sheet