

1. IDENTIFICATION**Product identifier**

Product Name

n-Butanol

Chemical Name

Butan-1-ol

CAS No

71-36-3

Other means of identification

Pure substance/mixture

Substance

Recommended use of the chemical and restrictions on use

Application

Chemical intermediate and Solvent. Use: in cleaning agents, Lubricant, in coatings, in paints, in inks, in toners, Adhesives, Metal working fluids / rolling oils, Laboratory chemicals, personal care products and Disinfectant.

Uses advised against

No information available

Details of the supplier of the safety data sheet

Manufacturer Address

Perstorp Oxo AB

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Sweden

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Fax. +46 303 728607

www.perstorp.com

Supplier Address

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Toledo, Ohio 43612

Phone: 419-729-5448/ 800-537-0280

E-mail address

productinfo@perstorp.com

Emergency telephone number

USA

(+1) 866 519 4752 (contract no: 334101)

2. HAZARDS IDENTIFICATION**Classification of the substance or mixture**

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

Flammable liquids - Category 3

Label elements

Symbols/Pictograms



Signal word

Danger

Hazard statements

Causes serious eye damage

Harmful if swallowed
 Causes skin irritation
 May cause respiratory irritation. May cause drowsiness or dizziness

Flammable liquid and vapor

Precautionary Statements

Keep away from heat/sparks/open flames/hot surfaces. - No smoking
 Use explosion-proof electrical (ventilation and lighting) equipment
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 Call a POISON CENTER or doctor if you feel unwell

Contains: Butan-1-ol

Supplementary hazard information

No information available

Hazards not otherwise classified (HNOC)

None known

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Chemical Name	CAS No	Weight-%
Butan-1-ol	71-36-3	100

4. FIRST AID MEASURES

Description of first aid measures

General advice	Immediate medical attention is required. Emergency eyewash facilities must be located in the vicinity of where the product is handled. If unconscious place in recovery position and seek medical advice. First aid personnel should pay attention to their own safety.
Inhalation	Remove to fresh air. Rinse mouth with water. If irritation persists get medical advice/attention.
Skin contact	Wash off immediately with soap and plenty of water. Use lukewarm water if possible. Get medical attention if irritation develops and persists.
Eye contact	Immediate medical attention is required. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Use lukewarm water if possible. Keep eye wide open while rinsing.
Ingestion	Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Get medical attention.
Self-protection of the first aider	Avoid contact with skin, eyes or clothing.

Most important symptoms and effects, both acute and delayed

By ingestion: May cause abdominal pain, headache, nausea and diarrhoea. Large doses affect liver and kidneys. May have a narcotic effect. By inhalation: The substance causes respiratory tract irritation and have a narcotic effect. Inhalation of high concentrations of vapours may cause irritation of the respiratory tract with sore throat, coughing, shortness of breath, headaches, nausea, dizziness, dullness, and unconsciousness. It can as well give the same symptoms like those of ingestion. By skin contact: The substance has an irritating and degreasing effect. May cause allergic reactions. By eye contact: Vapours are irritating for the eyes, causing flood of tears and pain. Splashing may cause eye inflammation. Chronic effects: Prolonged inhalation has caused auditory nerve and vestibular injury resulting in severe vertigo and hearing loss in workers exposed to 1-butanol. Repeated or prolonged contact may degrease the skin resulting in drying, cracking and eczematous dermatitis. Person with pre-existing skin disorders or eye problems or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

5. FIRE-FIGHTING MEASURES**Suitable extinguishing media**

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

Unsuitable extinguishing media

High volume water jet.

Specific hazards arising from the chemical

The substance is a flammable liquid and may form explosive air/vapour mixtures. Vapours are heavier than air and may spread along floors. Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO₂).

Protective equipment and precautions for firefighters

Wear self-contained breathing apparatus and protective suit. Use personal protective equipment as required.

Additional information

Cool containers with flooding quantities of water until well after fire is out. Prevent fire extinguishing water from contaminating surface water or the ground water system. Foam should be applied in large quantities as it is broken down to some extent by the product.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions, protective equipment and emergency procedures****Personal precautions**

Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate affected area. Remove all sources of ignition.

Environmental precautions

Minimize the area spreading and cover the drains. Do not allow into any sewer, on the ground or into any body of water. Local authorities should be advised if significant spillages cannot be contained. See Section 12 for additional ecological information.

Methods and material for containment and cleaning up**Methods for containment**

Prevent further leakage or spillage if safe to do so

Small spill	Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal
Large spill	Pump up the product into a spare container suitably labelled.

Methods for cleaning up

Clean contaminated surface thoroughly.

Reference to other sections

See Section 7,8,13 for more information.

7. HANDLING AND STORAGE**Precautions for safe handling**

Ensure adequate ventilation, especially in confined areas. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Take precautionary measures against static discharges. Use spark-proof tools and explosion-proof equipment. Use personal protection recommended in Section 8.

General Hygiene Considerations

Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Store in a well-ventilated place. Keep tightly closed in a dry and cool place. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Keep under nitrogen blanket.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Users are advised to consider national Occupational Exposure Limits or other equivalent values, (if existing).

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Butan-1-ol 71-36-3	TWA: 20 ppm	TWA: 100 ppm TWA: 300 mg/m ³ (vacated) S* (vacated) Ceiling: 50 ppm (vacated) Ceiling: 150 mg/m ³	IDLH: 1400 ppm Ceiling: 50 ppm Ceiling: 150 mg/m ³

Appropriate engineering controls

Eyewash stations. Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Eye/face protection
Hand Protection

Tight sealing safety goggles.
Wear protective gloves. Ensure that the breakthrough time of the glove material is not exceeded. Refer to glove supplier for information on breakthrough time for specific gloves.

Duration of contact	Glove material	Glove thickness	Break through time	Remarks
Suitable materials also with prolonged, direct contact (corresponding > 480 minutes of permeation time):	Butyl rubber	0.7 mm		
Suitable materials also with prolonged, direct contact (corresponding > 480 minutes of permeation time):	Nitrile rubber, NBR	0.4 mm		

Skin and body protection Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (in case of splashes).
Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment. Suitable respiratory protection for lower concentrations or short-term exposure:
Gas filter for gases/vapours of organic compounds (boiling point >65°C e.g. organic vapor/gas cartridge)
Suitable respiratory protection for higher concentrations or long-term exposure:
Self-contained breathing apparatus.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance

liquid
colorless

Odor

sweet

Odor threshold

No data available

Property

Value

Remarks • Method

pH	5	@ 20°C (47 g/l)
Melting point / freezing point	-90 °C / -130 °F	lit.
Boiling point / boiling range	117 °C / 243 °F	OECD Test No. 103: Boiling Point
Flash point	36 °C / 97 °F	ASTM D 7094-04
Evaporation rate		No information available
Flammability (solid, gas)		Not applicable
Explosive limits		
Upper explosive limits	11.2 Vol-%	lit.
Lower explosive limits	1.4 Vol-%	lit.
Vapor pressure	1.0 kPa	@ 25°C (lit.)
Vapor density		No information available
Relative density	0.81	D20/4, ISO 2811-2
Water solubility	47 g/L	@ 20 °C OECD Test No. 105: Water Solubility
Solubility(ies)		No information available
Partition coefficient	1.1	log POW (@25°C) OECD Test No. 117: Partition

Autoignition temperature	320 °C / 608 °F	Coefficient (n-octanol/water), HPLC Method ASTM E 659-78
Decomposition temperature		Not applicable
Kinematic viscosity		No information available
Dynamic viscosity	2.9 mPa s	@ 20°C, ISO 3219
Explosive properties		The product is not explosive. However, formation of explosive air/vapour mixtures are possible.
Oxidizing properties		Not oxidizing.
Density		No information available
Bulk density		No information available

Other Information

No information available

10. STABILITY AND REACTIVITY**Reactivity**

The substance is an alcohol. Alcohols exhibit both weak acid and weak base behavior. They may initiate the polymerization of isocyanates and epoxides. The substance forms esters through condensation reactions. The substance may be oxidized to aldehydes and ketones.

Chemical stability

Stable under normal conditions.

Possibility of Hazardous Reactions

Reacts with: Oxidizing substances, Strong acids. Reacts with ethylene carbonate to form butyl cellosolve (n-butoxyethanol) (highly toxic). Reacts with nitrous acid to form butyl nitrite (toxic). Reacts with ammonia to produce toxic butylamine.

Conditions to avoid

Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity).

Incompatible materials

Strong oxidizing agents. Attacks plastic and rubber.

Hazardous decomposition products

Thermal decomposition can lead to release of irritating and toxic gases and vapors. Carbon monoxide (CO). Carbon dioxide (CO₂).

11. TOXICOLOGICAL INFORMATION**Information on likely routes of exposure**

Inhalation. Dermal.

Symptoms related to the physical, chemical and toxicological characteristics

See Section 4 for more information.

Numerical measures of toxicity**Acute toxicity**

Harmful if swallowed.

Butan-1-ol (71-36-3)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 401: Acute Oral Toxicity	Rat	Oral	2290	mg/kg LD50 (lethal dose)
OECD Test No. 402: Acute Dermal Toxicity	Rabbit	Dermal	3430	mg/kg LD50 (lethal dose)
OECD Test No. 403: Acute Inhalation Toxicity	Rat	Inhalation	>17.76	mg/l LC0
Unknown	Hamster	Oral	1200	mg/kg LD50 (lethal dose)

Skin corrosion/irritation

Irritating to skin.

Butan-1-ol (71-36-3)			
Method	Species	Exposure route	Results
	Rabbit	Dermal	Irritating to skin

Serious eye damage/eye irritation

Irritating to eyes. Risk of serious damage to eyes.

Butan-1-ol (71-36-3)			
Method	Species	Exposure route	Results
OECD Test No. 405: Acute Eye Irritation/Corrosion	Rabbit	Eye	Irritating to eyes Causes serious eye damage

Respiratory or skin sensitization

Not a skin sensitizer.

Butan-1-ol (71-36-3)			
Method	Species	Exposure route	Results
OECD Test No. 406: Skin Sensitization		Skin	Not a skin sensitizer

Germ cell mutagenicity

Not mutagenic.

Butan-1-ol (71-36-3)			
Method	Species	Exposure route	Results
In vitro Mammalian Chromosome Aberration Test		in vitro	Negative
OECD Test No. 476: In vitro Mammalian Cell Gene Mutation Test		in vitro	Negative
OECD Test No. 474: Mammalian Erythrocyte Micronucleus Test		in vivo	Negative
Ames test		in vitro	Negative

Carcinogenicity

Since all in vitro and in vivo mutagenicity studies are negative, there is no hint for any carcinogenic potential.

Reproductive toxicity

The material has been tested in rats and found to cause no significant reproductive effects.

Butan-1-ol (71-36-3)				
Method	Species	Exposure route	Effective dose	Remarks
OECD Test No. 416: Two-Generation Reproduction Toxicity	Rat	Inhalation	750	ppm NOAEC (F1, F2) Developmental effects read-across from supporting substance (structural analogue)
OECD Test No. 416: Two-Generation Reproduction Toxicity	Rat	Inhalation	2000	ppm NOAEC (F0, F1) Effects on fertility read-across from supporting substance (structural analogue)
Ministry of Health and Welfare, Japan; Guidelines for Toxicity Studies of Drugs	Rat	Oral	1454	mg/kg bw/day NOAEL Developmental effects
	Rat	Inhalation	10.8	mg/l NOAEL Developmental effects

STOT - single exposure

Irritating to respiratory system

Butan-1-ol (71-36-3)				
Method	Species	Exposure route	Effective dose	Remarks

human data	human data	Inhalation		Irritating to respiratory system
	Rat	Inhalation		Irritating to respiratory system

STOT - repeated exposure

Butan-1-ol (71-36-3)				
Method	Species	Exposure route	Effective dose	Remarks
(US EPA 90-day)	Rat	Oral	125	mg/kg bw/day NOAEL
EPA OTS 798.2450 (90-day)	Rat	Inhalation	2.35	mg/l NOAEL read-across from supporting substance (structural analogue)

Aspiration hazard

No hazard identified.

12. ECOLOGICAL INFORMATION**Toxicity**

Low toxicity to aquatic organisms.

Butan-1-ol (71-36-3)					
Method	Species	Exposure route	Effective dose	Exposure time	Remarks
OECD Test No. 203: Fish, Acute Toxicity Test	Pimephales promelas	Freshwater	1376	96h	mg/l LC50 (lethal concentration)
OECD Test No. 202: Daphnia sp. Acute Immobilization Test	Daphnia magna	Freshwater	1328	48h	mg/l EC50 (effective concentration)
OECD Test No. 201: Freshwater Alga and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriella subcapitata	Freshwater	225	96h	mg/l EC50 (effective concentration)
OECD Test No. 211: Daphnia magna Reproduction Test	Daphnia magna	Freshwater	4.1	21d	mg/l NOEC
DIN 38412, part 8 (Pseudomonas cell multiplication inhibition test)	Bacteria toxicity	Freshwater	4390	17h	mg/l EC50 (effective concentration)

Persistence and degradability

Readily biodegradable

Butan-1-ol (71-36-3)			
Method	Value	Exposure time	Results
	46 - 53 h		DT50 Abiotic Degradation photolysis
	92%	20d	Readily biodegradable

Bioaccumulative potential

No bioaccumulation potential

Chemical Name	Partition coefficient	Bioconcentration factor (BCF)
Butan-1-ol	0.81	

Mobility in soil

The product does not adsorb to suspended solids and sediment based upon the log Koc which indicates a high mobility in soil.

Chemical Name	Log Koc
Butan-1-ol	0.388

Other adverse effects

No information available

13. DISPOSAL CONSIDERATIONS

Disposal methods

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Butan-1-ol - 71-36-3	Not available	Included in waste stream: F039	Not available	U031
Chemical Name		California Hazardous Waste Status		
Butan-1-ol		Toxic		

Contaminated packaging

Contaminated packaging materials must be disposed of in the same manner as the product. Thoroughly emptied and clean packaging may be recycled.

14. TRANSPORT INFORMATION



DOT Road transport

UN/ID no	UN1120
UN proper shipping name	Butanols
Proper Shipping Description	UN1120, Butanols, 3, III
Transport hazard class(es)	3
Packing Group	III
Special precautions for user	B1, IB3, T2, TP1
Emergency Response Guide Number	129

RID Rail transport

UN number	UN1120
UN proper shipping name	Butanols
Proper Shipping Description	UN1120, Butanols, 3, III
Transport hazard class(es)	3
Packing Group	III
ADR Hazard Id (Kemmler Number)	30

IMDG Sea transport

UN number	UN1120
UN proper shipping name	Butanols
Proper Shipping Description	UN1120, Butanols, 3, III, (36°C c.c.)
Transport hazard class(es)	3
Packing Group	III
EmS-No.	F-E, S-D
Special precautions for user	223
Limited quantity (LQ)	5 L
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No information available

IATA Air transport

UN number	UN1120
UN proper shipping name	Butanols
Proper Shipping Description	UN1120, Butanols, 3, III
Transport hazard class(es)	3
Packing Group	III
Special precautions for user	A3

ERG Code 3L
 Limited quantity (LQ) 10 L

15. REGULATORY INFORMATION

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

International Regulations

Not applicable.

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	No
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Butan-1-ol 71-36-3	5000 lb	Not available	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Not applicable

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

NFPA	Health hazards 3	Flammability 3	Instability 0	Physical and Chemical Properties Not available Personal protection X
HMIS	Health hazards 3	Flammability 3	Physical hazards 0	

Key or legend to abbreviations and acronyms used in the safety data sheet

Not applicable

Issue Date 25-Aug-2015

Revision Date 25-Aug-2015

Revision Note SDS sections updated: 15

This safety data sheet complies with the requirements of: OSHA Hazard Communication Standard (29 CFR 1910.1200).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet