

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**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****Perstorp Oxo AB**

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E-mail address productinfo@perstorp.com**Emergency telephone number****Europe** (+)1 760 476 3961 (contract no: 334101)**Americas** (+)1 760 476 3962 (contract no: 334101)**Middle East and Africa** (+)1 760 476 3959 (contract no: 334101)**Asia Pacific** (+)1 760 476 3960 (contract no: 334101)**2. HAZARDS IDENTIFICATION****Hazards description**

The substance is a flammable liquid and may form explosive air/vapour mixtures.

Vapours may spread along floors and be ignited by electrostatic charges.

The substance may cause permanent eye damages and by skin contact irritation and dehydration.

Vapours are irritating to the respiratory system and also affects the central nervous system which may cause drowsiness or dizziness.

Early symptoms of exposure may include fatigue and headache.

Classification of the substance or mixture

Acute toxicity - Oral

Category 4 - (H302)

Acute toxicity - Dermal

Category 5 - (H313)

Skin corrosion/irritation

Category 2 - (H315)

Serious eye damage/eye irritation

Category 1 - (H318)

Specific target organ toxicity (single exposure)

Category 3 - (H335,H336)

Flammable liquids

Category 3 - (H226)

Label elements**Symbols/Pictograms**

**Signal word**

Danger

Hazard statements

H318 - Causes serious eye damage

H302 - Harmful if swallowed

H313 - May be harmful in contact with skin

H315 - Causes skin irritation

H335 - May cause respiratory irritation

H336 - May cause drowsiness or dizziness

H226 - Flammable liquid and vapour

Precautionary statements

P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking

P241 - Use explosion-proof electrical/ ventilating/ lighting/ equipment

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower

P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

P312 - Call a POISON CENTRE or doctor if you feel unwell

Contains: Butan-1-ol

Other hazards

No information available

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 vapours.

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

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

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.

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

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

Chemical Name	Argentina	Russia	Egypt
Butan-1-ol 71-36-3	Ceiling: 50 ppm Skin	TWA: 10 mg/m ³ STEL: 30 mg/m ³	Ceiling: 50 ppm Ceiling: 152 mg/m ³ S*
Chemical Name	Singapore	Thailand	Malaysia
Butan-1-ol 71-36-3	STEL: 50 ppm STEL: 152 mg/m ³	Not available	Skin Ceiling: 50 ppm Ceiling: 152 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 (protective index 6, corresponding > 480 minutes of permeation time according to EN 374):	Butyl rubber	0.7 mm		Gloves must conform to standard EN 374
Suitable materials also with prolonged, direct contact (protective index 6, corresponding > 480 minutes of permeation time according to EN 374):	Nitrile rubber, NBR	0.4 mm		Gloves must conform to standard EN 374

Skin and body protection

Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 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. Type A)
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
colourless

Odour

sweet

Odour threshold

No data available

Property pH

Values
5

Remarks • Method
@ 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.
Vapour pressure	1.0 kPa	@ 25°C (lit.)
Vapour 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 Coefficient (n-octanol/water), HPLC Method
Autoignition temperature	320 °C / 608 °F	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.
Oxidising 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: Oxidising 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 oxidising agents. Attacks plastic and rubber.

Hazardous decomposition products

Thermal decomposition can lead to release of irritating and toxic gases and vapours. 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 sensitisation

Not a skin sensitiser.

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

Germ cell mutagenicity

Not mutagenic.

Butan-1-ol (71-36-3)			Results
Method	Species		
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 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 Algae and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriell a 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

	92%	20d	photolysis Readily biodegradable
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Bioaccumulative potential

No bioaccumulation potential

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

Mobility in soilThe product does not adsorb to suspended solids and sediment based upon the log K_{oc} which indicates a high mobility in soil.

Chemical Name	Log K _{oc}
Butan-1-ol	0.388

Other adverse effects

No information available

13. DISPOSAL CONSIDERATIONS**Disposal methods**

The product is classified as hazardous waste and must be disposed of as such. Incinerate at a licensed installation.

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**ADR Road transport**

UN number	UN1120
UN proper shipping name	Butanols
Proper Shipping Description	UN1120, Butanols, 3, III, (D/E)
Transport hazard class(es)	3
Subsidiary hazard class	3
Packing Group	III
Tunnel restriction code	(D/E)
Limited quantity (LQ)	5 L
ADR Hazard Id (Kemmler Number)	30

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.

Argentina

See section 8 for national exposure control parameters

Egypt

See section 8 for national exposure control parameters

Malaysia

See section 8 for national exposure control parameters

Russia

See section 8 for national exposure control parameters

Singapore

See section 8 for national exposure control parameters

Thailand

Not applicable

16. OTHER INFORMATION

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

Not applicable

Issue Date 12-Jun-2015

Revision Date 12-Jun-2015

Revision Note No information available.

This safety data sheet complies with the requirements of: Globally Harmonised System (GHS).

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