n-Butanol

SECTION 1 IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Trade name n-Butanol

Synonyms Butyl Alcohol, 1-Butanol

Use Fuel additive, Industrial use, Intermediate, Oilfield, Paint and Coatings, Process/Extraction Solvent, Raw material for chemical processes, Raw material for industry, Solvent

Company Sasol Chemicals (USA) LLC
(an affiliate of Sasol Chemicals North America LLC)

Address 12120 Wickchester Lane   Houston TX 77079

Telephone CHEMTREC North America Transportation Emergency (24-hr) (800) 424-9300
CHEMTREC World Wide (703) 527-3887
Other Emergencies (24-hr) (337) 494-5142
SDS and Product Information (8:00am-4:30pm CST) (281) 588-3491
Health and Safety Information (7:30am-4:00pm CST) (281) 588-3492

E-mail address SasolElectronicSDS@us.sasol.com

SECTION 2 HAZARDS IDENTIFICATION

OSHA/GHS Hazards Flammable liquids Category 3
Acute toxicity (Oral) Category 4
Serious eye damage Category 1
Skin irritation Category 2
Specific target organ toxicity - single exposure Category 3 (Narcotic effects)
Specific target organ toxicity - single exposure Category 3 (Resp. irritation)

LABEL ELEMENTS

Hazard symbols

Signal word Danger

Hazard statements H226 Flammable liquid and vapour.
H302 Harmful if swallowed.
H315 Causes skin irritation.
n-Butanol

H318   Causes serious eye damage.
H335   May cause respiratory irritation.
H336   May cause drowsiness or dizziness.

Precautionary statements

Prevention
P210   Keep away from heat/sparks/open flames/hot surfaces. No smoking.
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.
P280   Wear protective gloves/ eye protection/ face protection.
P264   Wash skin thoroughly after handling.
P261   Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

Response
P303 + P361 + P353   IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P332 + P313   If skin irritation occurs: Get medical advice/ attention.
P370 + P378   In case of fire: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide for extinction.
P301 + P312   IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338   IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P340   IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

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

SECTION 3   COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Butanol</td>
<td>71-36-3</td>
<td>&gt;=99</td>
</tr>
</tbody>
</table>

See Section 8 for Exposure Guidelines and Section 15 for Regulatory Classifications.

SECTION 4   FIRST AID MEASURES

Eye contact   Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
n-Butanol

Skin contact  Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. When symptoms persist or in all cases of doubt seek medical advice. Wash contaminated clothing before re-use.

Inhalation  Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. In case of shortness of breath, give oxygen. Call a physician immediately.

Ingestion  If swallowed, call a poison control centre or doctor immediately. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

SECTION 5  FIREFIGHTING MEASURES

FLAMMABLE PROPERTIES

Fire/explosion  Flash back possible over considerable distance. NFPA Class II combustible liquid.

Suitable extinguishing media  Water spray, Alcohol-resistant foam, Dry chemical, Carbon dioxide (CO2)

Protective equipment and precautions for firefighters  Wear self-contained breathing apparatus and protective suit. Keep containers and surroundings cool with water spray.

SECTION 6  ACCIDENTAL RELEASE MEASURES

Methods and materials for containment and cleaning up  Evacuate personnel to safe areas. Remove all sources of ignition. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Do not flush into surface water or sanitary sewer system.

Spill precautions  Material can create slippery conditions.

SECTION 7  HANDLING AND STORAGE

Safe handling advice  Ensure all equipment is electrically grounded before beginning transfer operations.

Storage/Transport pressure  Ambient

Load/Unload temperature  Ambient

SECTION 8  EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING MEASURES  Ensure adequate ventilation, especially in confined areas.
n-Butanol

PERSONAL PROTECTIVE EQUIPMENT

**Eyes**
Wear as appropriate: Goggles, Face-shield

**Skin**
Wear suitable protective clothing, gloves and eye/face protection.

**Inhalation**
Respiratory protection is normally not required except in emergencies or when conditions cause excessive airborne levels of mists or vapors. Use NIOSH approved respiratory protection.

EXPOSURE GUIDELINES

<table>
<thead>
<tr>
<th>Components</th>
<th>Exposure limit(s)</th>
</tr>
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<tbody>
<tr>
<td>1-Butanol</td>
<td>OSHA PEL (Permissible Exposure Limit) 100 ppm 300 mg/m³</td>
</tr>
<tr>
<td></td>
<td>ACGIH TLV (8-hour) 20 ppm</td>
</tr>
</tbody>
</table>

*Skin Hazard: Skin exposure should be prevented or reduced to control skin absorption.*

<table>
<thead>
<tr>
<th>PEL=</th>
<th>Permissible Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLV=</td>
<td>Threshold Limit Value</td>
</tr>
<tr>
<td>EL=</td>
<td>Excursion Limit</td>
</tr>
<tr>
<td>TWA=</td>
<td>Time Weighted Average (8 hr.)</td>
</tr>
<tr>
<td>STEL=</td>
<td>Short Term Exposure Limit (15 min.)</td>
</tr>
<tr>
<td>WEEL=</td>
<td>Workplace Environmental Exposure Level</td>
</tr>
</tbody>
</table>

SECTION 9  PHYSICAL AND CHEMICAL PROPERTIES

**Appearance**
liquid;

**Colour**
colourless

**Form**
liquid

**Odour**
sweet pungent

**Odour Threshold**
No data available

**Flash point**
38 °C, 100 °F; ASTM D 93;

**Flammability**
Upper explosion limit: 11.2 %(V)
Lower explosion limit: 1.4 %(V)

**Boiling point/boiling range**
117 °C, 242 °F;

**Melting point/range**
-89 °C, -128 °F;

**Auto-ignition temperature**
343 °C, 649 °F;

**Decomposition temperature**
No data available
n-Butanol

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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<tbody>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>4.5 mm Hg @ 25 °C, 78 °F;</td>
</tr>
<tr>
<td>Vapour density</td>
<td>2 - 3</td>
</tr>
<tr>
<td>Density</td>
<td>0.805 g/cm³ @ 27 °C, 80 °F;</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>No data available</td>
</tr>
<tr>
<td>Water solubility</td>
<td>7.8 g/100g partly soluble</td>
</tr>
<tr>
<td>Viscosity</td>
<td>4 cSt @ 20 °C, 68 °F;</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>No data available</td>
</tr>
</tbody>
</table>

**SECTION 10  STABILITY AND REACTIVITY**

- **Reactivity**: Stable at normal ambient temperature and pressure.
- **Chemical stability**: No decomposition if stored and applied as directed.
- **Conditions to avoid**: Keep away from heat and sources of ignition.
- **Hazardous decomposition products**: Combustion products include carbon dioxide, carbon monoxide and possibly other unidentified organic compounds.
- **Materials to avoid**: Can react with strong oxidizers, inorganic acids, and halogens.
- **Hazardous polymerisation**: None.

**SECTION 11  TOXICOLOGICAL INFORMATION**

- **Acute dermal toxicity**: LD50 Rabbit: 2,000 - 5,300 mg/kg
- **Acute inhalation toxicity**: LC50 Rat (4 hours): 7.4 mg/l
- **Acute oral toxicity**: LD50 Rat: 300 - 2,000 mg/kg
Skin corrosion/irritation
Primary irritation (Rabbit): 24 hours; 1.4 (Max. score is 8.0.)

Serious eye damage/eye irritation
Primary irritation (Rabbit): 27.3 (Max. score is 110.)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Genotoxicity in vitro: No data available

Genotoxicity in vivo: No data available

Assessment Mutagenicity: No data available

Reproductive toxicity
Reproductive toxicity: No data available

Assessment Reproductive toxicity: No data available

Teratogenicity: No data available

Assessment teratogenicity: No data available

STOT - single exposure
No data available

STOT - repeated exposure
No data available

Aspiration toxicity
No data available

Carcinogenicity
Assessment carcinogenicity: Contains no ingredient listed as a carcinogen

**SECTION 12 ECOLOGICAL INFORMATION**

**Aquatic toxicity**
Non-toxic to aquatic life.

**Toxicity to fish**
LC50 (Pimephales promelas (fathead minnow)) 96 hours: 1,376 mg/l
n-Butanol

Toxicity to aquatic invertebrates
EC50 (Daphnia magna (Water flea)) 48 hours: 1,328 mg/l

Toxicity to algae
ErC50 (Pseudokirchneriella subcapitata (green algae)) 96 hours: 225 mg/l

Chronic toxicity to fish
No data available

Chronic toxicity to aquatic invertebrates
No data available

Biodegradation
Readily biodegradable.
Closed Bottle test (20 d): 92 %

Bioaccumulative potential
No data available

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Waste Code
D001 - Ignitability (RQ 100 LB). Re-evaluation of the product may be required by the user at the time of disposal, since the product uses, transformations, mixtures, contamination, and spillage may change the classification.

Disposal methods
Land disposal of this product is restricted. Dispose of only in accordance with local, state, and federal regulations. Do not contaminate any lakes, streams, ponds, groundwater or soil.

Empty containers. Empty containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, triple-rinsed, properly bunged and promptly returned to a drum reconditioner, or properly disposed.

SECTION 14 TRANSPORT INFORMATION

DOT
UN 1120, Butanols, 3, III
When shipped in quantities greater than 5,000 lbs, RQ must be added to the shipping description.
n-Butanol

IATA  UN 1120, Butanols, 3, III
When shipped in quantities greater than 5,000 lbs, RQ must be added to the shipping description.

IMDG  UN 1120, Butanols, 3, III
When shipped in quantities greater than 5,000 lbs, RQ must be added to the shipping description.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Remarks  No data available

SECTION 15  REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TSCA Inventory Listing
Components  CAS-No.
1-Butanol  71-36-3

SARA 302 Status
Components  CAS-No.  Weight percent
1-Butanol  >= 99 %

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 311/312 Classification
"Immediate (acute) health hazard", "Fire hazard"

SARA 313 Chemical
Components  CAS-No.  Weight percent
1-Butanol  71-36-3  >= 99 %

US. EPA CERCLA Hazardous Substances (40 CFR 302)
Components  Reportable Quantity  Weight percent
1-Butanol  5,000 LB  >= 99 %
n-Butanol

INTERNATIONAL REGULATIONS

WHMIS Classification

Flammable liquids Category 3
Acute toxicity (Oral) Category 4
Serious eye damage Category 1
Skin irritation Category 2
Specific target organ toxicity - single exposure Category 3 (Narcotic effects)
Specific target organ toxicity - single exposure Category 3 (Resp. irritation)

European Union
Classification according to Regulation (EU) 1272/2008.

Flammable liquids, Category 3
Acute toxicity (Oral), Category 4
Serious eye damage, Category 1
Skin irritation, Category 2
Specific target organ toxicity - single exposure, Category 3 (Narcotic effects)
Specific target organ toxicity - single exposure, Category 3 (Resp. irritation)

Australia. Inventory of Chemical Substances (AICS) Listed
Japan. Inventory of Existing and New Chemical Substances (ENCS) Listed
Japan. ISHL - Inventory of Chemical Substances Listed
Canada. Domestic Substances List (DSL) Inventory Listed
Canada. Non-Domestic Substance Listing (NDSL) Not listed
Philippines. Inventory of Chemicals / Chemical Substances (PICCS) Listed
Korea. Existing Chemicals Inventory (KECI) Listed
China. Inventory of Existing Chemical Substances (IECSC) Listed
Mexico Listed
New Zealand. Inventory of Chemical Substances Listed
Switzerland Listed
Taiwan. National Existing Chemical Inventory (NECI) Listed
Please note: The names and CAS numbers which are used for this product in the stated inventories may deviate from the information which is listed in Section 3.

STATE REGULATIONS

California Prop. 65
Components
none

SECTION 16 OTHER INFORMATION

HAZARD RATINGS

<table>
<thead>
<tr>
<th></th>
<th>Health</th>
<th>Flammability</th>
<th>Physical Hazard/Instability</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMIS®</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>NFPA</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

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