SAFETY DATA SHEET

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  900 Threadneedle Ste 100   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
          MSDS 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

GHS Hazards

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquids</td>
<td>Category 3</td>
</tr>
<tr>
<td>Acute toxicity (Oral)</td>
<td>Category 4</td>
</tr>
<tr>
<td>Serious eye damage</td>
<td>Category 1</td>
</tr>
<tr>
<td>Skin irritation</td>
<td>Category 2</td>
</tr>
<tr>
<td>Specific target organ toxicity - single exposure</td>
<td>Category 3 (Narcotic effects)</td>
</tr>
<tr>
<td>Specific target organ toxicity - single exposure</td>
<td>Category 3 (Resp. irritation)</td>
</tr>
</tbody>
</table>

LABEL ELEMENTS

Hazard symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable</td>
<td></td>
</tr>
<tr>
<td>Corrosive</td>
<td></td>
</tr>
</tbody>
</table>

Signal word  Danger

Hazard statements  H226 Flammable liquid and vapour.
                   H302 Harmful if swallowed.
                   H315 Causes skin irritation.
                   H318 Causes serious eye damage.
                   H335 May cause respiratory irritation.
                   H336 May cause drowsiness or dizziness.
n-Butanol

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 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 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.

**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.
n-Butanol

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.

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
Components  Exposure limit(s)
1-Butanol  OSHA PEL (Permissible Exposure Limit) 100 ppm 300 mg/m3
            ACGIH TLV (8-hour) 20 ppm
n-Butanol

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

### SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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<tbody>
<tr>
<td>Appearance</td>
<td>liquid;</td>
</tr>
<tr>
<td>Colour</td>
<td>colourless</td>
</tr>
<tr>
<td>Form</td>
<td>liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>sweet pungent</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>no data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>38 °C, 100 °F; ASTM D 93;</td>
</tr>
<tr>
<td>Flammability</td>
<td>Upper explosion limit: 11.2 %(V)</td>
</tr>
<tr>
<td></td>
<td>Lower explosion limit: 1.4 %(V)</td>
</tr>
<tr>
<td>Boiling point/boiling</td>
<td>117 °C, 242 °F;</td>
</tr>
<tr>
<td>range</td>
<td></td>
</tr>
<tr>
<td>Melting point/range</td>
<td>-89 °C, -128 °F;</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>343 °C, 649 °F;</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>no data available</td>
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<tr>
<td>Flammability (solid, gas)</td>
<td>no data available</td>
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<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>
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<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>
</tbody>
</table>
n-Butanol

Evaporation rate  no data available
Partition coefficient: n-octanol/water  no data available

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.)
Eye damage/irritation  Primary irritation (rabbit): 27.3 (Max. score is 110.)
Respiratory or skin sensitization  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
n-Butanol

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

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 %

Bioaccumulation no data available

Mobility in soil no data available

Other adverse effects no data available

SECTION 13 DISPOSAL CONSIDERATIONS
n-Butanol

**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.

**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**

**OSHA Hazards (HCS 1994)**  
Flammable liquid, Eye irritation, Skin irritation

**TSCA Inventory Listing**

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Butanol</td>
<td>71-36-3</td>
</tr>
</tbody>
</table>

**SARA 302 Status**

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SARA 302: 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”
n-Butanol

SARA 313 Chemical Components
1-Butanol

CAS-No. 71-36-3

Weight percent >= 99 %

US. EPA CERCLA Hazardous Substances (40 CFR 302)

Components
1-Butanol

Reportable Quantity 5,000 LB

Weight percent >= 99 %

INTERNATIONAL REGULATIONS

WHMIS Classification
Class B, Division 2: Flammable liquid.
Class D, Division 2, Subdivision B: Toxic material.

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. Industrial Safety & Health Law (ISHL) Inventory Listed
Canada. Domestic Substances List (DSL) Inventory Listed
Canadian Non-Domestic Substance Listing (NDSL) Not listed
European Inventory of Existing Commercial Chemical Substances (EINECS) Listing Listed
Philippines. Inventory of Chemicals / Chemical Substances (PICCS) Listed
Korea. Existing Chemicals Inventory (KECI) Listed
China. Inventory of Existing Chemical Substances (IECSC) Listed
Mexico. National Inventory of Chemical Substances (INSQ) Listed
New Zealand. Inventory of Chemicals (NZIoC) Listed
Switzerland. Inventory of Notified New Substances (CHINV) Listed
Taiwan. National Existing Chemical Inventory (NECI) Listed
n-Butanol

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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