ANGUS CHEMICAL COMPANY encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product name</th>
<th>L-2-Amino-1-Butanol</th>
</tr>
</thead>
</table>

**Manufacturer or supplier's details**

<table>
<thead>
<tr>
<th>Company name of supplier</th>
<th>ANGUS CHEMICAL COMPANY</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>1500 E. LAKE COOK ROAD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Buffalo Grove IL 60089-6553</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer Information Number</th>
<th>+1-847-808-3711</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>E-mail address</th>
<th><a href="mailto:NAR_CC@ANGUS.COM">NAR_CC@ANGUS.COM</a></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Emergency telephone number</th>
<th>800-424-9300</th>
</tr>
</thead>
</table>

**Recommended use of the chemical and restrictions on use**

**Recommended use**

Chemical intermediate.
Neutralizing agent.
For industrial use.

The ANGUS Chemical Company recommends that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact the Customer Information Group (see Section 1 of this data sheet).

2. HAZARDS IDENTIFICATION

**GHS Classification**

<table>
<thead>
<tr>
<th>Flammable liquids</th>
<th>Category 4</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Acute toxicity (Oral)</th>
<th>Category 4</th>
</tr>
</thead>
</table>
Product name: L-2-Amino-1-Butanol

Skin corrosion Category 1
Serious eye damage Category 1

GHS Label elements, including precautionary statements

Hazard pictograms

Signal word Danger

Hazard statements
Combustible liquid.

Harmful if swallowed.

Causes severe skin burns and eye damage.

Precautionary statements

Prevention:
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
Wash contaminated clothing before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage:
Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.
3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a substance.

Components

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levo-2-Amino-1-butanol</td>
<td>5856-63-3</td>
<td>&gt;= 95.0 %</td>
</tr>
<tr>
<td>2-(Methylamino)-1-butanol</td>
<td>27646-79-3</td>
<td>&lt;= 2.0 %</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>&lt;= 1.0 %</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

If inhaled
Move person to fresh air; if effects occur, consult a physician.

In case of skin contact
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Seek medical attention if symptoms occur or irritation persists. Wash clothing before reuse. Suitable emergency safety shower facility should be immediately available.

In case of eye contact
Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

If swallowed
Seek medical attention immediately. Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth unless the person is fully conscious.

Most important symptoms and effects, both acute and delayed
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Protection of first-aiders
First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Notes to physician
If burn is present, treat as any thermal burn, after decontamination. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. No specific antidote. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if
lavage is done. Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist.

5. FIREFIGHTING MEASURES

Suitable extinguishing media
- Water fog or fine spray.
- Carbon dioxide fire extinguishers.
- Dry chemical fire extinguishers.
- Foam.
- Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Specific hazards during firefighting
Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

Hazardous combustion products
During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to:
- Carbon dioxide.
- Carbon monoxide.
- Nitrogen oxides.

Further information
Keep people away. Isolate fire and deny unnecessary entry. Do not use direct water stream. May spread fire. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Burning liquids may be extinguished by dilution with water.

Special protective equipment for firefighters
Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
- Keep upwind of spill.
- Ventilate area of leak or spill.
- No smoking in area.
- Only trained and properly protected personnel must be involved in clean-up operations.
- Evacuate area.
- Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to section 7, Handling, for additional precautionary
Environmental precautions

Spills or discharge to natural waterways is likely to kill aquatic organisms.
Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up

Contain spilled material if possible.
Collect in suitable and properly labeled containers.
See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Advice on safe handling

Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.
Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers.

Keep away from heat, sparks and flame.
Do not swallow.
Wash thoroughly after handling.
Avoid breathing vapor or mist.
Use with adequate ventilation.
Do not get in eyes, on skin, on clothing.
Keep container closed.
See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage

Keep containers tightly closed when not in use to prevent formation of carbonate salts.
Store in a dry place.
Store in original unopened container.
Do not store in:
Zinc.
Galvanized containers.
Aluminum.
Copper.
Copper alloys.
Brass.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

Engineering measures

Local exhaust ventilation may be necessary for some operations.
Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be
sufficient for most operations.

**Personal protective equipment**

Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process.

For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, use an approved air-purifying respirator.

The following should be effective types of air-purifying respirators:

Organic vapor cartridge with a particulate pre-filter, type AP2.

Hand protection

Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Chlorinated polyethylene. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. Avoid gloves made of: Polyvinyl alcohol ("PVA"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Eye protection

Use chemical goggles.

Skin and body protection

Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

---

### 9. PHYSICAL AND CHEMICAL PROPERTIES

- **Appearance**: Liquid.
- **Color**: Colorless to yellow
- **Odor**: Ammoniacal
- **Odor Threshold**: No test data available
- **pH**: $> 12$ (20 °C)  
  Method: pH Electrode
- **Melting point/range**: 4 °C (39 °F)
### Product name: L-2-Amino-1-Butanol

**Issue Date:** 11/02/2017

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Method/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freezing point</strong></td>
<td>-11 °C (12 °F)</td>
<td>Method: Literature</td>
</tr>
<tr>
<td><strong>Boiling point/boiling range</strong></td>
<td>178 - 181 °C (352 - 358 °F)</td>
<td>Method: Distillation</td>
</tr>
<tr>
<td><strong>Flash point</strong></td>
<td>88.9 °C (192.0 °F)</td>
<td>Method: Setaflash Closed Cup ASTM D3828 Test Type: closed cup</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td><strong>Flammability (solid, gas)</strong></td>
<td>No data available.</td>
<td></td>
</tr>
<tr>
<td><strong>Upper explosion limit</strong></td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td><strong>Lower explosion limit</strong></td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td><strong>Vapor Pressure</strong></td>
<td>&lt; 1.00 mmHg (25 °C)</td>
<td>Method: Estimated.</td>
</tr>
<tr>
<td><strong>Relative Vapor Density (air = 1)</strong></td>
<td>3</td>
<td>Method: Estimated.</td>
</tr>
<tr>
<td><strong>Relative density</strong></td>
<td>0.94 (25 °C)</td>
<td>Method: Pyknometer</td>
</tr>
<tr>
<td><strong>Water solubility</strong></td>
<td>soluble in water</td>
<td></td>
</tr>
<tr>
<td><strong>Partition coefficient: n-octanol/water</strong></td>
<td>log Pow: -0.45</td>
<td>Method: Measured Bioconcentration potential is low (BCF &lt; 100 or Log Pow &lt; 3).</td>
</tr>
<tr>
<td><strong>Auto-ignition temperature</strong></td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td><strong>Decomposition temperature</strong></td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>30.8 cP (25 °C)</td>
<td>Method: Literature (Brookfield Viscosity)</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>no data available</td>
<td></td>
</tr>
<tr>
<td><strong>Explosive properties</strong></td>
<td>No data available.</td>
<td></td>
</tr>
<tr>
<td><strong>Oxidizing properties</strong></td>
<td>No data available.</td>
<td></td>
</tr>
<tr>
<td><strong>Molecular weight</strong></td>
<td>89.14 g/mol</td>
<td>Method: Literature</td>
</tr>
</tbody>
</table>

*Active ingredient*
Hygroscopic: yes

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: No dangerous reaction known under conditions of normal use.

Chemical stability: Hygroscopic
Stable under recommended storage conditions. See Storage, Section 7.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose.
Product absorbs carbon dioxide from the air.
Reaction with carbon dioxide may form carbonate salts.
Avoid moisture.

Incompatible materials: Avoid contact with:
Strong acids.
Strong oxidizers.
Avoid contact with metals such as:
Zinc.
Galvanized metals.
Aluminum.
Copper.
Copper alloys.
Brass.
Avoid unintended contact with:
Halogenated hydrocarbons.

Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials.

11. TOXICOLOGICAL INFORMATION

Toxicological information on this product or its components appear in this section when such data is available.

Acute toxicity

Product:

Acute oral toxicity: Remarks: Low toxicity if swallowed.
Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.
Swallowing may result in irritation or burns of the mouth, throat, and gastrointestinal tract.

LD50 (Rat, male and female): 1,800 mg/kg

Acute inhalation toxicity: Remarks: At room temperature, exposure to vapor is minimal
due to low volatility.  
Vapor from heated material or mist may cause respiratory irritation.  

Remarks: The LC50 has not been determined.  

Acute dermal toxicity  Remarks: Absorption has not been determined due to corrosivity.  

Remarks: The dermal LD50 has not been determined.  

Skin corrosion/irritation  

**Product:**  
Result: Corrosive  
Remarks: Brief contact may cause skin burns. Symptoms may include pain, severe local redness and tissue damage.  

Serious eye damage/eye irritation  

**Product:**  
Result: Corrosive  
Remarks: May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur. Mist may cause eye irritation.  

Respiratory or skin sensitization  

**Product:**  
Remarks: For similar material(s):  
Did not cause allergic skin reactions when tested in guinea pigs.  

Remarks: For respiratory sensitization:  
No relevant data found.  

Carcinogenicity  

**Product:**  
No relevant data found.  

| IARC | No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. |
| OSHA | No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA. |
| NTP  | No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. |
Teratogenicity

Product
2-Aminobutanol hydrochloride salt caused maternal toxicity leading to death of embryos when administered orally to pregnant rats in a reproductive screening study. No developmental effects were observed in this study.

Mutagenicity

Product
In vitro genetic toxicity studies were negative.

Reproductive toxicity

Product:
In animal studies, did not interfere with reproduction.

STOT - single exposure

Product:
Assessment: Material is corrosive. Material is not classified as a respiratory irritant; however, upper respiratory tract irritation or corrosivity may be expected.

Repeated dose toxicity

Product:
Remarks: In animals, effects have been reported on the following organs: Liver.

Aspiration toxicity

Product:
Aspiration Hazard Based on physical properties, not likely to be an aspiration hazard.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:
Toxicity to fish

Remarks: Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested).

LC50 (Leuciscus idus (Golden orfe)): 270 mg/l
Exposure time: 96.0 h
Test Type: static test
Method: OECD Test Guideline 203 or Equivalent

LC50 (Oncorhynchus mykiss (rainbow trout)): > 952 mg/l
Exposure time: 96.0 h
Test Type: static test
Product name: L-2-Amino-1-Butanol

Issue Date: 11/02/2017

Toxicity to daphnia and other aquatic invertebrates
EC50 (Daphnia magna (Water flea)): 115.00 mg/l
Exposure time: 48.0 h
Test Type: static test
Method: OECD Test Guideline 202 or Equivalent

Toxicity to algae
ErC50 (Pseudokirchneriella subcapitata (green algae)): > 0.94 mg/l
End point: Growth rate inhibition
Exposure time: 96 h
Test Type: static test
Method: OECD Test Guideline 201 or Equivalent

M-Factor (Acute aquatic toxicity)
1

Toxicity to bacteria
EC50 (activated sludge): 329.2 mg/l
End point: Respiration rates.
Exposure time: 3 h
Test Type: static test
Method: OECD 209 Test

Persistence and degradability

Product:

Biodegradability
Test Type: aerobic
Inoculum: Sewage, domestic, non-adapted
Concentration: 11 mg/l
Biodegradation: 93 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent
Remarks: 10-day Window: Pass

ThOD
2.690 mg/mg
Method: Calculated.

Photodegradation
Sensitiser: OH radicals
Rate constant: Degradation half life: 0.2 d
Method: Estimated.

Bioaccumulative potential

Product:

Partition coefficient: n-octanol/water
log Pow: -0.45
Method: Measured
Remarks: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Mobility in soil

Product:

Distribution among environmental compartments
Koc: < 1
Method: Estimated.
Remarks: Potential for mobility in soil is very high (Koc between 0 and 50).
Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

Other adverse effects

Product:
Ozone-Depletion Potential

Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues
DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR Into ANY BODY OF WATER.
All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations.
Regulations may vary in different locations.
Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.
THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information.
FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. Landfill.
ANGUS HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL.

14. TRANSPORT INFORMATION

International Regulation

IATA-DGR
UN/ID No. UN 3267
Proper shipping name Corrosive liquid, basic, organic, n.o.s. (Levo-2-Amino-1-butanol)
Class 8
Packing group III
Labels Corrosive
Packing instruction (cargo aircraft) 856
Packing instruction 852
(passenger aircraft)

**IMDG-Code**

- **UN number**: UN 3267
- **Proper shipping name**: CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (Levo-2-Amino-1-butanol)
- **Class**: 8
- **Packing group**: III
- **Labels**: F-A, S-B
- **Marine pollutant**: no
- **Remarks**: Stowage category A
- **Alkalis**

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

Not applicable for product as supplied.

**National Regulations**

**49 CFR (DOT) – NON BULK**

- **UN/ID/NA number**: 3267
- **Proper shipping name**: CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.

<table>
<thead>
<tr>
<th>Class</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
<tr>
<td>Labels</td>
<td>Class 8 - Corrosive</td>
</tr>
<tr>
<td>ERG Code</td>
<td>153</td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>no</td>
</tr>
</tbody>
</table>

**49 CFR (DOT) - BULK**

- **UN/ID/NA number**: 3267
- **Proper shipping name**: CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (Levo-2-Amino-1-butanol)

<table>
<thead>
<tr>
<th>Class</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
<tr>
<td>Labels</td>
<td>Class 8 - Corrosive</td>
</tr>
<tr>
<td>ERG Code</td>
<td>153</td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>no</td>
</tr>
</tbody>
</table>

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

**15. REGULATORY INFORMATION**

**OSHA Hazards**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

- Combustible Liquid, Harmful by ingestion., Corrosive to skin
EPCRA - Emergency Planning and Community Right-to-Know Act

SARA 311/312 Hazards
- Fire Hazard
- Acute Health Hazard

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

SARA 313
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act
This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 12 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act
This product does not contain any Hazardous Substances listed under the U.S. Clean Water Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. Clean Water Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

US State Regulations

Massachusetts Right To Know
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know
The following chemicals are listed because of the additional requirements of Pennsylvania law:

<table>
<thead>
<tr>
<th>Cas No.</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>5856-63-3</td>
<td>Levo-2-Amino-1-butanol</td>
</tr>
</tbody>
</table>

New Jersey Right To Know
The following chemicals are listed because of the additional requirements of New Jersey law:

<table>
<thead>
<tr>
<th>Cas No.</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>5856-63-3</td>
<td>Levo-2-Amino-1-butanol</td>
</tr>
<tr>
<td>27646-79-3</td>
<td>2-(Methylamino)-1-butanol</td>
</tr>
</tbody>
</table>

California Prop. 65
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:
- United States TSCA Inventory
- All Components OK
TSCA list:
No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

Remarks:
2-(Methylamino)-1-butanol is considered an impurity in this product and is therefore not required to be specifically listed on certain chemical control inventories such as TSCA.

16. OTHER INFORMATION

Further information

NFPA:

Health

Flammability

Instability

Special hazard.

HMIS III:

<table>
<thead>
<tr>
<th>Category</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTH</td>
<td>3</td>
</tr>
<tr>
<td>FLAMMABILITY</td>
<td>2</td>
</tr>
<tr>
<td>PHYSICAL HAZARD</td>
<td>0</td>
</tr>
</tbody>
</table>

0 = not significant, 1 = Slight, 2 = Moderate, 3 = High, 4 = Extreme, * = Chronic

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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.

Full text of other abbreviations

(Q)SAR - (Quantitative) Structure Activity Relationship; ASTM - American Society for the Testing of Materials; bw - Body weight; DIN - Standard of the German Institute for Standardisation; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISO - International Organisation for Standardization; LC50 - Lethal Concentration to 50% of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative; DSL - Domestic Substances List (Canada); KECI - Korea Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); AICS - Australian Inventory of Chemical Substances; IECSC - Inventory of Existing Chemical Substances in China; ENCS - Existing and New Chemical Substances (Japan); ISHL - Industrial Safety and Health Law (Japan); PICCS - Philippines Inventory of Chemicals and Chemical Substances; NZIoC - New Zealand Inventory of Chemicals; TCSI - Taiwan Chemical Substance Inventory; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; DOT - Department of Transportation; EHS - Extremely Hazardous Substance; HMIS - Hazardous Materials Identification System; MSHA - Mine Safety and Health Administration; NFPA - National Fire Protection Association; RCRA - Resource Conservation and Recovery Act; RQ - Reportable Quantity; SARA - Superfund Amendments and Reauthorization Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; GLP - Good Laboratory Practice; ERG - Emergency Response Guide; NTP - National Toxicology Program; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods