MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product code: B1187
Product Name: SEC-BUTYL ALCOHOL
Chemical Name: sec-Butyl Alcohol
Synonyms:

(+)-2-Butanol
1-Methyl propanol
1-Methyl-1-propanol
1-Methylpropyl alcohol
2-Butanol
2-Butyl alcohol
2-Hydroxybutane
Alcohol butylique secondaire (French)
Butan-2-ol
Butanol secondaire (French)
Butanol-2
Butylene hydrate
DL-Butan-2-ol
Ethylmethyl carbinol
Methylethylcarbinol
Racemic-2-butanol
dl-Methylethylcarbinol
s-Butanol
s-Butyl alcohol
sec-Butanol

Recommended use: Solvent. Perfuming agent.
CAS #: 78-92-2
Formula: CH3-CH2-CH(OH)CH3
RTECS #: EO1750000
CI#: Not available
Supplier: Spectrum Chemicals and Laboratory Products, Inc.
14422 South San Pedro St.
Gardena, CA 90248
(310) 516-8000
Emergency Telephone Number: CHEMTREC: 1-800-424-9300
Contact Person: Martin LaBenz (West Coast)
Contact Person: Chris Terpak (East Coast)
2. HAZARDS IDENTIFICATION

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

POTENTIAL HEALTH EFFECTS

Principal Routes of Exposure:
Ingestion. Skin. Eyes. Inhalation.

Acute Potential Health Effects:

Skin Contact:
May cause skin irritation. It may be absorbed through the skin.

Eye Contact:
Causes eye irritation. Severe eye irritation. Causes conjunctivitis. May cause corneal opacity. Possible eye damage.

Inhalation:
Vapors irritating to eyes and respiratory tract. Inhalation of vapors may cause dizziness or suffocation. May cause central nervous system effects. May cause cardiovascular effects. May cause nausea and vomiting. May affect respiration. May affect the liver. May affect the urinary system. It may affect the blood.

Ingestion:
Ingestion may cause gastrointestinal irritation, nausea, vomiting, and diarrhoea. May cause central nervous system effects. May affect respiration. May affect the cardiovascular system.

Chronic Potential Health Effects:

Carcinogen Status: No information available


Teratogenic Effects: No information available

Mutagenic Effects: No information available


See Section 11 for additional Toxicological Information

POTENTIAL ENVIRONMENTAL EFFECTS
No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
</table>

Product code: B1187 Product name: SEC-BUTYL ALCOHOL
3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>78-92-2</td>
<td>100</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

**General Advice:** Poison information centres in each State capital city can provide additional assistance for scheduled poisons (13 1126)

**Skin Contact:** Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Get medical attention. If skin irritation persists, call a physician.

**Eye Contact:** Flush eye with water for 15 minutes. Get medical attention.

**Inhalation:** Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

**Ingestion:** Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician if necessary.

**Notes to Physician:** Treat symptomatically

5. FIRE-FIGHTING MEASURES

**Flammable Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashpoint (°C/°F)</td>
<td>24 °C/75 °F</td>
</tr>
<tr>
<td>Lower Explosion Limit (%)</td>
<td>1.7%</td>
</tr>
<tr>
<td>Upper Explosion Limit (%)</td>
<td>9.8%</td>
</tr>
<tr>
<td>Autoignition Temperature (°C/°F)</td>
<td>405-406 °C/761-762.8 °F</td>
</tr>
</tbody>
</table>

**Suitable Extinguishing Media:** Carbon dioxide (CO2). Dry chemical. Alcohol-resistant foam. Water spray.

**Unsuitable Extinguishing Media:** Do not use a solid (straight) water stream as it may scatter and spread fire.

**Hazardous Combustion Products:** Carbon monoxide; Carbon dioxide

**Specific hazards:** Flammable. May be ignited by heat, sparks or flames. Material can burn with invisible flame. Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks). Container explosion may occur under fire conditions or when heated. Fire may produce irritating, corrosive and/or toxic gases.

**Special Protective Equipment for Firefighters:** As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
Specific Methods:
Water mist may be used to cool closed containers. For larger fires, use water spray or fog. Cool containers with flooding quantities of water until well after fire is out.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid contact with skin, eyes and clothing. Use personal protective equipment. Remove all sources of ignition. Pay attention to flashback. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use spark-proof tools and explosion-proof equipment. In case of large spill, water spray or vapor suppressing foam may be used to reduce vapors, but may not prevent ignition in closed spaces.

Environmental Precautions:
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Prevent entry into waterways, sewers, basements or confined areas. In case of large spill, dike if needed. Dike far ahead of liquid spill for later disposal.

Methods for Cleaning Up:
Absorb spill with inert material (e.g. vermiculite, dry sand or earth), then place in a suitable chemical waste container. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Handling

Technical Measures/Precautions:
Provide sufficient air exchange and/or exhaust in work rooms. Remove all sources of ignition. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Keep away from incompatible materials.

Safe Handling Advice:
Wear personal protective equipment. Use only in well-ventilated areas. Avoid contact with skin, eyes and clothing. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Do not breathe vapors or spray mist. Do not ingest. When using do not smoke. Handle in accordance with good industrial hygiene and safety practice.

Storage

Technical Measures/Storage Conditions:
Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Keep away from heat and sources of ignition. Store in a segregated and approved area. Store away from incompatible materials.

Incompatible Products:

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures to reduce exposure:
Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Personal Protective Equipment

Eye protection: Goggles. Safety glasses with side-shields.
**Skin and body protection:** Chemical resistant apron. Long sleeved clothing. Gloves.

**Respiratory protection:** Vapor respirator. Be sure to use an approved/certified respirator or equivalent.

**Hygiene measures:** Avoid contact with skin, eyes and clothing. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product.

### National occupational exposure limits

#### United States

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>AIHA WHEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol - 78-92-2</td>
<td>150 ppm TWA</td>
<td>100 ppm TWA</td>
<td>100 ppm TWA</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>450 mg/m³ TWA</td>
<td>305 mg/m³ TWA</td>
<td>150 ppm STEL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>455 mg/m³ TWA</td>
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#### Canada

<table>
<thead>
<tr>
<th>Components</th>
<th>Alberta</th>
<th>British Columbia</th>
<th>Ontario</th>
<th>Quebec</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol - 78-92-2</td>
<td>100 ppm TWA</td>
<td>100 ppm TWA</td>
<td>100 ppm TWA</td>
<td>100 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>303 mg/m³ TWA</td>
<td>100 ppm TWA</td>
<td>150 ppm STEL</td>
<td>303 mg/m³ TWA</td>
</tr>
</tbody>
</table>

#### Australia and Mexico

<table>
<thead>
<tr>
<th>Components</th>
<th>Australia</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol - 78-92-2</td>
<td>100 ppm TWA</td>
<td>100 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>303 mg/m³ TWA</td>
<td>305 mg/m³ TWA</td>
</tr>
</tbody>
</table>

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**Physical state:** Liquid.

**Odor:** Strong. Sweet. Pleasant. Winey.

**Flash point (°C):** 24

**Autoignition Temperature (°C/F):** 405-406 °C/761-762.8 °F

**Boiling point/range(°C/°F):** 94-99.5 °C/201-211.1 °F

**Density (g/cm³):** No information available

**Evaporation rate:** 1.3 (butyl acetate = 1)

**Odor threshold (ppm):** 43

**Solubility:** Soluble in Water
Solubility in Water: 12.5 g/l @ 20 °C
Soluble in Acetone

**Appearance:** No information available

**Taste:** No information available

**Lower Explosion Limit (%):** 1.7%

**Flash point (°C):** 24

**Autoignition Temperature (°C/F):** 405-406 °C/761-762.8 °F

**Boiling point/range(°C/°F):** 94-99.5 °C/201-211.1 °F

**Density (g/cm³):** No information available

**Evaporation rate:** 1.3 (butyl acetate = 1)

**Odor threshold (ppm):** 43

**Solubility:** Soluble in Water
Solubility in Water: 12.5 g/l @ 20 °C
Soluble in Acetone

**Color:** Clear. Colorless.

**Molecular/Formula weight:** 74.12

**pH:** No information available

**Decomposition temperature(°C/°F):** No information available

**Specific gravity:** 0.8063 @ 20 °C

**Vapor pressure @ 20°C (kPa):** 1.6

**VOC content (g/L):** 806

**Miscibility:** Miscible with Ether

**Melting point/range(°C/°F):** -114 °C/-173.2 °F
10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions


Hazardous decomposition products: Carbon monoxide. Carbon dioxide. When heated to decomposition it emits acrid smoke and irritating fumes.

Possibility of Hazardous Reactions: It may react with aluminum at temperatures above 49 degrees C (120 degrees F) It ignites on contact with Chromium trioxide

Polymerization: Hazardous polymerisation does not occur

Corrosivity: No information available

Special Remarks on Corrosivity: No information available

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

sec-Butyl Alcohol - 78-92-2

LD50/oral/rat = 2193 mg/kg Oral LD50 Rat (LOLI)
6500 mg/kg (IUCLID)
2054 mg/kg (RTECS)
LD50/oral/mouse = No information available
LD50/dermal/rabbit = No information available
LD50/dermal/rat = > 2 g/kg Dermal LD50 Rat
LC50/inhalation/rat = 48500 mg/m³ Inhalation LC50 Rat 4 h
LC50/inhalation/mouse = No information available
Other LD50 or LC50 information =
4900 mg/kg Oral LD50 Rabbit (IUCLID)
4890 mg/kg Oral LD50 Rabbit (RTECS)

Product Information

LC50/inhalation/rat = No information available
LC50/inhalation/mouse = No information available
LD50/dermal/rabbit = No information available
LD50/dermal/rat = No information available
LD50/oral/mouse = No information available

LD50/oral/rat = No information available

Local Effects

Skin irritation: May cause skin irritation.

Eye irritation: Causes eye irritation. Severe eye irritation. Causes conjunctivitis. May cause corneal opacity. Possible eye damage.
Inhalation: Irritating to respiratory system. Can cause dyspnea (shortness of breath and difficulty breathing). May affect respiration (respiratory depression). May cause gastrointestinal tract irritation with nausea, vomiting, and diarrhea. Inhalation of high concentrations may cause central nervous system effects characterized by headache, dizziness, lightheadness, fainting, unconsciousness, coma. It may affect behavior/central nervous system (ataxia, general anesthetic, drowsiness). May cause muscle weakness. May affect cardiovascular system (bradycardia, tachycardia, cardiac arrhythmias).

Ingestion: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. May affect the cardiovascular system (change in heart rate). May affect respiration (difficult or labored breathing resulting in shortness of breath). May affect behavior/central nervous system (somnolence, ataxia). May affect behavior/central nervous system (coma).

Sensitization: No information available

Chronic Toxicity

Chronic Toxicity Repeated or prolonged skin contact may cause dryness and cracking of the skin. Prolonged or repeated inhalation may affect the liver. Prolonged or repeated inhalation may affect the kidneys. Prolonged or repeated inhalation may affect the blood (changes in serum composition).

Carcinogenic effects: Not considered carcinogenic

<table>
<thead>
<tr>
<th>Components</th>
<th>NTP</th>
<th>IARC</th>
<th>OSHA HCS - Carcinogens</th>
<th>ACGIH - Carcinogens</th>
<th>Australia - Prohibited Carcinogenic Substances</th>
<th>Australia - Notifiable Carcinogenic Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Mutagenic Effects: No information available

Reproductive Effects: May cause adverse reproductive effects based on animal test data

Teratogenic Effects: No information available


12. ECOLOGICAL INFORMATION

ECOTOXICITY

Toxicity to terrestrial and aquatic plants and animals: Information given is based on data on the components and the ecotoxicology of similar products

Ecotoxicity effects: Aquatic environment.

Aquatic toxicity:

sec-Butyl Alcohol - 78-92-2

Freshwater Fish Species Data: 3380 - 3990 mg/L LC50 Pimephales promelas (Fathead minnow) 96 h flow-through 1
3250 - 3540 mg/L LC50 Leuciscus idus melanotus (Carp) 48 h

Water Flea Data: 1859 - 7143 mg/L EC50 Daphnia magna 48 h 3750 mg/L LC50 Daphnia magna 24 h

Mobility: It is expected to have high mobility.

Persistence and degradability: Readily biodegradable

Product code: B1187 Product name: SEC-BUTYL ALCOHOL
Bioaccumulative potential: Potential for bioconcentration in aquatic organisms is low.

### 13. DISPOSAL CONSIDERATIONS

**Waste from residues / unused products:**
Waste must be disposed of in accordance with Federal, State and Local regulation.

**Contaminated packaging:**
Empty containers should be taken for local recycling, recovery or waste disposal

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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

### 14. TRANSPORT INFORMATION

**DOT**

- **UN-No:** UN1120
- **Proper Shipping Name:** Butanols
- **Hazard Class:** 3
- **Packing Group:** III
- **Subsidiary Risk:** Not applicable
- **Marine Pollutant:** No data available
- **ERG No:** 129
- **DOT RQ (lbs):** No information available

**TDG (Canada)**

- **UN-No:** UN1120
- **Proper Shipping Name:** Butanols
- **Hazard Class:** 3
- **Packing Group:** III
- **Subsidiary Risk:** No information available
- **Description:** No information available

**ADR**

- **UN-No:** UN1120
- **Proper Shipping Name:** Butanols
- **Hazard Class:** 3
- **Packing Group:** III
- **Subsidiary Risk:** No information available
- **Classification Code:** No information available
- **Description:** No information available
- **CEFIC Tremcard No:** No information available

**IMO / IMDG**

- **UN-No:** UN1120
- **Proper Shipping Name:** Butanols
- **Hazard Class:** 3
- **Packing Group:** III
- **Subsidiary Risk:** No information available
- **Description:** No information available
- **IMDG Page:** No information available
- **Marine Pollutant:** No information available
- **EMS:** F-E
- **MFAG:** No information available
- **Maximum Quantity:** No information available

**RID**

- **Product code:** B1187
- **Product name:** SEC-BUTYL ALCOHOL
UN-No: UN1120
Proper Shipping Name: Butanols
Hazard Class: 3
Packing Group: III
Subsidiary Risk: 3
Classification Code: No information available
Description: No information available

ICAO
UN-No: UN1120
Proper Shipping Name: Butanols
Hazard Class: 3
Packing Group: III
Subsidiary Risk: No information available
Description: No information available

IATA
UN-No: UN1120
Proper Shipping Name: Butanols
Hazard Class: 3
Packing Group: III
Subsidiary Risk: No information available
ERG Code: 3L
Description: No information available

15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Components</th>
<th>U.S. TSCA</th>
<th>Philippines (PICCS)</th>
<th>KOREA KECL</th>
<th>Japan ENCS</th>
<th>CHINA</th>
<th>Australia (AICS)</th>
<th>EINECS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>Present</td>
<td>Present</td>
<td>KE-03868</td>
<td>2-3049</td>
<td>Present</td>
<td>Present</td>
<td>201-158-5</td>
</tr>
</tbody>
</table>

U.S. Regulations

sec-Butyl Alcohol
- Massachusetts RTK: Present
- New Jersey RTK Hazardous Substance List: Present
- New Jersey (EHS) List: Present
- New Jersey - Discharge Prevention - List of Hazardous Substances: Present
- Pennsylvania RTK: Environmental hazard
- Pennsylvania RTK - Environmental Hazard List: Present
- Minnesota - Hazardous Substance List: Present
- California Directors List of Hazardous Substances: Present


Chemicals Known to the State of California to Cause Cancer:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Chemicals Known to the State of California to Cause Reproductive Toxicity:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

<table>
<thead>
<tr>
<th>Components</th>
<th>Carcinogen</th>
<th>Developmental Toxicity</th>
<th>Male Reproductive Toxicity</th>
<th>Female Reproductive Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

CERCLA/SARA

Product code: B1187 Product name: SEC-BUTYL ALCOHOL
Components

<table>
<thead>
<tr>
<th>CERCLA - Hazardous Substances and their Reportable Quantities</th>
<th>Section 302 Extremely Hazardous Substances and TPQs</th>
<th>Section 302 Extremely Hazardous Substances and RQs</th>
<th>Section 313 - Chemical Category</th>
<th>Section 313 - Reporting de minimis</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>1.0 % de minimis concentration</td>
</tr>
</tbody>
</table>

U.S. TSCA

<table>
<thead>
<tr>
<th>Components</th>
<th>TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)</th>
<th>TSCA 8(d) - Health and Safety Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>Not Applicable</td>
<td>01/26/1994/06/30/1998</td>
</tr>
</tbody>
</table>

Canada

WHMIS hazard class:
B2  Flammable liquid
D2B  Toxic materials

sec-Butyl Alcohol
B2  D2B

Canada Controlled Products Regulation:
This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

<table>
<thead>
<tr>
<th>Components</th>
<th>WHMIS Ingredient Disclosure List -</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>1 %</td>
</tr>
</tbody>
</table>

Inventory

<table>
<thead>
<tr>
<th>Components</th>
<th>Canada (DSL)</th>
<th>Canada (NDSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>Present</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>CEPA Schedule I - Toxic Substances</th>
<th>CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-Butyl Alcohol</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

EU Classification

**R-phrase(s)**
R10 - Flammable.
R67 - Vapors may cause drowsiness and diziness.***
R36/37 - Irritating to eyes and respiratory system.

**S-phrase(s)**
S 2 - Keep out of the reach of children.
S13 - Keep away from food, drink and animal feedingstuffs.
S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S46 - If swallowed, seek medical advice immediately and show this container or label.
S 7/9 - Keep container tightly closed and in a well-ventilated place.
S24/25 - Avoid contact with skin and eyes.

<table>
<thead>
<tr>
<th>Components</th>
<th>Classification</th>
<th>Safety Phrases</th>
</tr>
</thead>
</table>

Product code: B1187  Product name: SEC-BUTYL ALCOHOL
The product is classified in accordance with Annex VI to Directive 67/548/EEC

**Indication of danger:**
Flammable
Xi - Irritant.

**16. OTHER INFORMATION**

The MSDS format complies with ANSI Z400.1-2004 standards.

**Preparation Date**
01-Jun-2012

**Reason for revision:**
Not applicable

**Prepared by:**
Sonia Owen

**Literature reference:**
No information available

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. The physical properties reported in this MSDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.