SAFETY DATA SHEET

1. Identification

Product identifier: MEBSTAIN Apoptosis TUNEL Kit Direct
TdT buffer II

Other means of identification

Product code: 8445
Recommended use: Research use only.
Recommended restrictions: None known.

Manufacturer / Importer / Supplier / Distributor information

Manufacturer and Supplier (Asia)
4-5-3 Sakae, Naka-ku, Nagoya, Aichi 460-0008, Japan
Telephone number: +81-52-238-1901 (Monday to Friday, 9 AM to 5 PM JST)
Fax: +81-52-238-1440
E-mail: sds-support@mbl.co.jp
URL: http://www.mbl.co.jp/e/index.html
Contact person: SDS Support

Supplier
Medical & Biological Laboratories (MBL) Co., Ltd.
15A Constitution Way, Woburn, MA 01801, USA
Telephone number: +1-800-200-5459, option 3
Fax: +1-781-939-6963
E-mail: tech@mblintl.com
URL: http://www.mblintl.com/
Contact person: Technical Service

2. Hazard(s) identification

Physical hazards: Not classified.
Health hazards: Carcinogenicity Category 1A
Environmental hazards: Not classified.
OSHA hazard(s): Not classified.

Label elements
Hazard symbol:

Signal word: Danger
Hazard statement: May cause cancer.
Precautionary statement
Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required.
Response: If exposed or concerned: Get medical advice/attention.
Storage: Store locked up.
Disposal: Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC):
None.

Supplemental information:

3. Composition/Information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium cacodylate</td>
<td>21416-85-3</td>
<td>1.8</td>
</tr>
<tr>
<td>Cobalt dichloride</td>
<td>7646-79-9</td>
<td>≤ 0.04</td>
</tr>
</tbody>
</table>
Composition comments
All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures
Inhalation
Move to fresh air. Get medical attention if discomfort develops or persists.

Skin contact
Remove contaminated clothing. Wash with soap and water. Get medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

Eye contact
Rinse immediately with plenty of water, also under the eyelids. Get medical attention if irritation develops or persists.

Ingestion
Rinse mouth thoroughly. Get medical attention if any discomfort occurs.

Most important symptoms/effects, acute and delayed
May cause temporary irritation on skin or eye on direct contact.

Indication of immediate medical attention and special treatment needed
Treat symptomatically.

General information
Get medical attention if any discomfort develops.

5. Fire-fighting measures
Suitable extinguishing media

Unsuitable extinguishing media
None known.

Specific hazards arising from the chemical
Fire or high temperatures create: Carbon oxides. Arsenic oxides.

Special protective equipment and precautions for firefighters
Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

Fire-fighting equipment/instructions
Move containers from fire area if you can do it without risk. Use water spray to cool unopened containers. Prevent entry to sewers and public waters.

6. Accidental release measures
Personal precautions, protective equipment and emergency procedures
Ensure adequate ventilation. Avoid inhalation of mist and contact with skin and eyes. For personal protection, see Section 8 of the SDS.

Methods and materials for containment and cleaning up
Dike far ahead of liquid spill for later disposal. Small Spills: Absorb spillage with suitable absorbent material. Clean contaminated surface thoroughly. After removal, flush contaminated area thoroughly with water. Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

Environmental precautions
Prevent further leakage or spillage if safe to do so.

7. Handling and storage
Precautions for safe handling
Should be handled in closed systems, if possible. Obtain special instructions before use. Pregnant women should not work with the product, if there is the least risk of exposure. Provide adequate ventilation. Use work methods which minimize production of vapors and mists. Avoid inhalation of mist and contact with skin and eyes. Wash hands after handling. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities
Keep container tightly closed. Store away from incompatible materials.

8. Exposure controls/personal protection
Occupational exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt dichloride (CAS 7646-79-9)</td>
<td>TWA</td>
<td>0.02 mg/m3</td>
</tr>
</tbody>
</table>

Biological limit values

<table>
<thead>
<tr>
<th>Components</th>
<th>Value</th>
<th>Determinant</th>
<th>Specimen</th>
<th>Sampling Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH Biological Exposure Indices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cobalt dichloride (CAS 7646-79-9) | 15 µg/L | Cobalt | Urine | *
---|---|---|---|---
| 1 µg/L | Cobalt | Blood | *

* For sampling details, please see the source document.

Exposure guidelines
No exposure standards allocated.

Appropriate engineering controls
Provide adequate ventilation and minimise the risk of inhalation of vapours and mists.

Individual protection measures, such as personal protective equipment

**Eye/face protection** Wear safety goggles or face shield.

**Skin protection**

- **Hand protection** Wear protective gloves. Nitrile gloves are recommended, but be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.

- **Other protection** Wear appropriate clothing to prevent repeated or prolonged skin contact.

**Respiratory protection**

In case of inadequate ventilation or risk of inhalation of vapors, use suitable respiratory equipment with combination filter (gas filter/dust filter). Seek advice from local supervisor.

**Thermal hazards** Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations
Handle in accordance with good industrial hygiene and safety practice. Wash hands after handling. Routinely wash work clothing and protective equipment to remove contaminants. Observe any medical surveillance requirements.

### 9. Physical and chemical properties

**Appearance**

- **Physical state** Liquid.
- **Form** Liquid.
- **Color** Colorless.

- **Odor** Not available.
- **Odor threshold** Not available.
- **pH** 7.2 Neutral.

- **Melting point/freezing point** Not available.
- **Initial boiling point and boiling range** Not available.

- **Flash point** Not available.
- **Evaporation rate** Not available.

**Upper/lower flammability or explosive limits**

- Flammability limit Not available.
- - lower (%) Not available.
- - upper (%) Not available.

- **Vapor pressure** Not available.
- **Vapor density** Not available.
- **Relative density** Not available.
- **Solubility(ies)** Soluble in water.
- **Partition coefficient (n-octanol/water)** Not available.
- **Auto-ignition temperature** Not available.
- **Decomposition temperature** Not available.
- **Viscosity** Not available.

**10. Stability and reactivity**

**Reactivity** The product is non-reactive under normal conditions of use, storage and transport.

**Chemical stability** Stable at normal conditions.

**Possibility of hazardous reactions** None known.

**Conditions to avoid** Strong heating. Contact with incompatible materials.

**Incompatible materials** Strong oxidizing agents. Strong bases.
### 11. Toxicological information

#### Information on likely routes of exposure

**Inhalation**
Under normal conditions of intended use, this material is not expected to be an inhalation hazard.

**Skin contact**
Prolonged contact may cause dryness of the skin.

**Eye contact**
May cause eye irritation on direct contact.

**Ingestion**
Ingestion may cause irritation and malaise.

**Symptoms related to the physical, chemical and toxicological characteristics**
Irritation of eyes and mucous membranes. Mild skin irritation.

#### Information on toxicological effects

**Acute toxicity**
Large quantities: May cause discomfort if swallowed.

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium cacodylate (CAS 21416-85-3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral</td>
<td>LD50 Mouse</td>
<td>145 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Rat</td>
<td>763 mg/kg</td>
</tr>
</tbody>
</table>

**Skin corrosion/irritation**
Prolonged contact may cause dryness of the skin.

**Serious eye damage/eye irritation**
May cause eye irritation on direct contact.

**Respiratory or skin sensitization**

**Respiratory sensitization**
The product contains a small amount of sensitizing substance which may provoke an allergic reaction among sensitive individuals.

**Skin sensitization**
The product contains a small amount of sensitizing substance which may provoke an allergic reaction among sensitive individuals.

**Germ cell mutagenicity**
Not classified.

**Carcinogenicity**
May cause cancer.

Not listed.

**ACGIH**
Group A1: confirmed human carcinogen (listed as Arsenic).

**IARC**
Group 2B: possibly carcinogenic to humans (listed as Arsenic).

**NTP**
Group a: known to be human carcinogen.

**Reproductive toxicity**
Not classified.

**Specific target organ toxicity**

- **Single exposure**
  Not classified.

- **Repeated exposure**
  Not classified.

**Aspiration hazard**
Not classified.

**Further information**
Repeated ingestion or inhalation of arsenic compounds may adversely affect the skin, liver, circulatory system, upper respiratory tract and lungs.

### 12. Ecological information

#### Ecotoxicity

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium cacodylate (CAS 21416-85-3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aquatic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crustacea</td>
<td>LC50 Water flea (Daphnia magna)</td>
<td>3.3 - 4.3 mg/L, 48 hours</td>
</tr>
<tr>
<td>Cobalt dichloride (CAS 7646-79-9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aquatic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algae</td>
<td>EC50 Green alga (Chlorella vulgaris)</td>
<td>0.6 mg/L, 96 hours</td>
</tr>
</tbody>
</table>

**Persistence and degradability**
The product is not expected to be readily biodegradable.

**Bioaccumulative potential**
No data available.

**Mobility in soil**
Expected to be highly mobile in soil.

**Mobility in general**
The product is water soluble and may spread in water systems.
### 13. Disposal considerations

<table>
<thead>
<tr>
<th><strong>Other adverse effects</strong></th>
<th>No data available.</th>
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#### DOT

<table>
<thead>
<tr>
<th><strong>UN number</strong></th>
<th>UN3082</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UN proper shipping name</strong></td>
<td>Environmentally hazardous substances, liquid, n.o.s. (Potassium cacodylate, Cobalt dichloride)</td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>9</td>
</tr>
<tr>
<td>Subsidiary risk</td>
<td>-</td>
</tr>
<tr>
<td>Label(s)</td>
<td>9</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
<td>III</td>
</tr>
<tr>
<td><strong>Environmental hazards</strong></td>
<td></td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Special precautions for user</strong></td>
<td>Read safety instructions, SDS and emergency procedures before handling.</td>
</tr>
<tr>
<td><strong>Special provisions</strong></td>
<td>8, 146, 335, IB3, T4, TP1, TP29</td>
</tr>
<tr>
<td><strong>Packaging exceptions</strong></td>
<td>155</td>
</tr>
<tr>
<td><strong>Packaging non bulk</strong></td>
<td>203</td>
</tr>
<tr>
<td><strong>Packaging bulk</strong></td>
<td>241</td>
</tr>
</tbody>
</table>

#### IATA

<table>
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<th><strong>UN number</strong></th>
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<tbody>
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</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>9</td>
</tr>
<tr>
<td>Subsidiary risk</td>
<td>-</td>
</tr>
<tr>
<td>Label(s)</td>
<td>9</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
<td>III</td>
</tr>
<tr>
<td><strong>Environmental hazards</strong></td>
<td></td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Special precautions for user</strong></td>
<td>Read safety instructions, SDS and emergency procedures before handling.</td>
</tr>
<tr>
<td><strong>ERG Code</strong></td>
<td>9L</td>
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#### IMDG

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<tbody>
<tr>
<td><strong>UN proper shipping name</strong></td>
<td>Environmentally hazardous substances, liquid, n.o.s. (Potassium cacodylate, Cobalt dichloride)</td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>9</td>
</tr>
<tr>
<td>Subsidiary risk</td>
<td>-</td>
</tr>
<tr>
<td>Label(s)</td>
<td>9</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
<td>III</td>
</tr>
<tr>
<td><strong>Environmental hazards</strong></td>
<td></td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>EmS</strong></td>
<td>F-A, S-F</td>
</tr>
<tr>
<td><strong>Special precautions for user</strong></td>
<td>Read safety instructions, SDS and emergency procedures before handling.</td>
</tr>
</tbody>
</table>
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

This substance/mixture is not intended to be transported in bulk.

### 15. Regulatory information

#### US federal regulations

- **TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**: Not regulated.
- **CERCLA Hazardous Substance List (40 CFR 302.4)**: Cobalt dichloride (CAS 7646-79-9) Listed.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

<table>
<thead>
<tr>
<th>Hazard categories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SARA 302 Extremely hazardous substance</td>
<td></td>
</tr>
<tr>
<td>SARA 311/312 Hazardous chemical</td>
<td></td>
</tr>
<tr>
<td>SARA 313 (TRI reporting)</td>
<td></td>
</tr>
</tbody>
</table>

**Other federal regulations**

- **Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**: Cobalt dichloride (CAS 7646-79-9)
- **Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**: Not regulated.
- **Safe Drinking Water Act (SDWA)**: Not regulated.

**US state regulations**

- **Massachusetts RTK - Substance List**: Not regulated.
- **New Jersey Worker and Community Right-to-Know Act**: Cobalt dichloride (CAS 7646-79-9)
- **Pennsylvania RTK - Hazardous Substances**: Not regulated.
- **Rhode Island RTK**: Cobalt dichloride (CAS 7646-79-9)
- **California Proposition 65**: Not listed.

#### International Inventories

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>No</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>No</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>No</td>
</tr>
<tr>
<td>Europe</td>
<td>EC Inventory</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>No</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>No</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>No</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>No</td>
</tr>
<tr>
<td>United States &amp; Puerto</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>No</td>
</tr>
</tbody>
</table>

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s). A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

### 16. Other information

<table>
<thead>
<tr>
<th>Issue date</th>
<th>01/30/2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revision date</td>
<td>09/30/2016</td>
</tr>
<tr>
<td>Version</td>
<td>10</td>
</tr>
<tr>
<td>List of abbreviations</td>
<td>EC50: Effective Concentration, 50%. LC50: Lethal Concentration, 50%. LD50: Lethal Dose, 50%.</td>
</tr>
</tbody>
</table>
Disclaimer
This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

Further information
Not available.

References
IUCLID
SAFETY DATA SHEET

1. Identification

Product identifier: MEBSTAIN Apoptosis TUNEL Kit Direct
Other means of identification:
Product code: 8445
Recommended use: Research use only.
Recommended restrictions: None known.

Manufacturer / Importer / Supplier / Distributor information
Manufacturer and Supplier (Asia):
Medical & Biological Laboratories (MBL) Co., Ltd.
4-5-3 Sakae, Naka-ku, Nagoya, Aichi 460-0008, Japan
Telephone number: +81-52-238-1901 (Monday to Friday, 9 AM to 5 PM JST)
Fax: +81-52-238-1440
E-mail: sds-support@mbl.co.jp
URL: http://www.mbl.co.jp/e/index.html
Contact person: SDS Support

Manufacturer and Supplier:
MBL International Corporation
15A Constitution Way, Woburn, MA 01801, USA
Telephone number: +1-800-200-5459, option 3
Fax: +1-781-939-6963
E-mail: tech@mblintl.com
URL: http://www.mblintl.com/
Contact person: Technical Service

2. Hazard(s) identification

Physical hazards: Not classified.
Health hazards: Not classified.
OSHA hazard(s): Not classified.

Label elements
Hazard symbol: None.
Signal word: None.
Hazard statement: None.
Precautionary statement
Prevention: Observe good industrial hygiene practices.
Response: Wash thoroughly after handling.
Storage: Store away from incompatible materials.
Disposal: Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC): None.

3. Composition/Information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol (Glycerin)</td>
<td>56-81-5</td>
<td>50-60</td>
</tr>
</tbody>
</table>

Composition comments: All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First aid measures

Inhalation: Move to fresh air. Get medical attention if discomfort develops or persists.
Skin contact: Remove contaminated clothing. Wash with soap and water. Get medical attention if irritation develops or persists. Wash contaminated clothing before reuse.
Eye contact
Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention if irritation develops or persists.

Ingestion
Drink plenty of water. Seek medical advice.

Most important symptoms/effects, acute and delayed
Irritation of eyes and mucous membranes. Mild skin irritation.

Indication of immediate medical attention and special treatment needed
Treat symptomatically.

General information
Get medical attention if any discomfort develops.

5. Fire fighting measures

Suitable extinguishing media

Unsuitable extinguishing media
None known.

Specific hazards arising from the chemical
Fire or high temperatures create: Carbon oxides.

Special protective equipment and precautions for firefighters
Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

Fire-fighting equipment/instructions
Move containers from fire area if you can do that without risk. Use water spray to cool unopened containers. Prevent entry to sewers and public waters.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Ensure adequate ventilation. Avoid inhalation of mist and contact with skin and eyes. For personal protection, see Section 8 of the SDS.

Methods and materials for containment and cleaning up
Dike far ahead of liquid spill for later disposal. Small Spills: Absorb spillage with suitable absorbent material. Clean contaminated surface thoroughly. After removal, flush contaminated area thoroughly with water. Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

Environmental precautions
Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling
Provide adequate ventilation. Use work methods which minimize production of vapors and mists. Avoid inhalation of mist and contact with skin and eyes. Wash hands after handling. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities
Keep container tightly closed. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol (CAS 56-81-5)</td>
<td>PEL</td>
<td>5 mg/m3</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 mg/m3</td>
<td>Total dust.</td>
</tr>
</tbody>
</table>

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

US. ACGIH Threshold Limit Values

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol (CAS 56-81-5)</td>
<td>TWA</td>
<td>10 mg/m3</td>
<td>Mist.</td>
</tr>
</tbody>
</table>

Biological limit values
No biological exposure limits noted for the ingredient(s).

Exposure guidelines
No exposure standards allocated.

Appropriate engineering controls
Provide adequate ventilation and minimize the risk of inhalation of vapors and mists.

Individual protection measures, such as personal protective equipment

Eye/face protection
Wear safety glasses.
9. Physical and chemical properties

**Appearance**
- **Physical state**: Liquid.
- **Form**: Viscous liquid.
- **Color**: Colorless.
- **Odor**: Odorless.
- **Odor threshold**: Not available.
- **pH**: Neutral.
- **Melting point/freezing point**: Not available.
- **Initial boiling point and boiling range**: Not available.
- **Flash point**: Not available.
- **Evaporation rate**: Not available.
- **Flammability (solid, gas)**: Not applicable.

**Upper/lower flammability or explosive limits**
- **Flammability limit - lower (%)**: Not available.
- **Flammability limit - upper (%)**: Not available.

**Vapor pressure**: Not available.
- **Vapor density**: Not available.
- **Relative density**: Not available.
- **Solubility(ies)**: Soluble in water.
- **Partition coefficient (n-octanol/water)**: Not available.
- **Auto-ignition temperature**: Not available.
- **Decomposition temperature**: Not available.
- **Viscosity**: Not available.

10. Stability and reactivity

**Reactivity**: The product is non-reactive under normal conditions of use, storage and transport.
- **Chemical stability**: Stable at normal conditions.
- **Possibility of hazardous reactions**: Hazardous reactions do not occur.
- **Conditions to avoid**: Strong heating. Contact with incompatible materials.
- **Incompatible materials**: Strong oxidizing agents.
- **Hazardous decomposition products**: None known.

11. Toxicological information

**Information on likely routes of exposure**
- **Ingestion**: Ingestion may cause irritation and malaise.
- **Inhalation**: Under normal conditions of intended use, this material is not expected to be an inhalation hazard.
Skin contact: May cause skin irritation. Causes skin irritation.
Eye contact: May cause eye irritation on direct contact. Causes eye irritation.
Symptoms related to the physical, chemical and toxicological characteristics:

Information on toxicological effects:
- Acute toxicity: Ingestion may cause irritation and malaise.
- Skin corrosion/irritation: May cause skin irritation.
- Serious eye damage/eye irritation: May cause eye irritation on direct contact.
- Respiratory sensitization: Not classified.
- Skin sensitization: Not a skin sensitizer.
- Germ cell mutagenicity: Not classified.
- Carcinogenicity: IARC not listed.
- Reproductive toxicity: Not classified.
- Specific target organ toxicity - single exposure: Knowledge about health hazard is incomplete.
- Specific target organ toxicity - repeated exposure: Knowledge about health hazard is incomplete.
- Skin sensitization: Not a skin sensitizer.
- Germ cell mutagenicity: Not classified.
- Carcinogenicity: IARC not listed.
- Reproductive toxicity: Not classified.

12. Ecological information

Ecotoxicity: The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills have a harmful or damaging effect on the environment.

Persistence and degradability: The product is biodegradable.
Bioaccumulative potential: The product is not bioaccumulating.
- Partition coefficient $n$-octanol / water (log $K_{ow}$): Glycerol (CAS 56-81-5) -1.76

Mobility in soil: Expected to be highly mobile in soil.
Mobility in general: The product is water soluble and may spread in water systems.
Other adverse effects: No data available.

13. Disposal considerations

Disposal instructions: Dispose of in accordance with all applicable regulations. Do not discharge into drains, water courses or onto the ground.
Local disposal regulations: Dispose of in accordance with local regulations.
Hazardous waste code: Not regulated.
Waste from residues / unused products: Dispose of in accordance with local regulations.
Contaminated packaging: Dispose of in same manner as unused product.

14. Transport information

DOT: Not regulated as a dangerous good.
IATA: Not regulated as a dangerous good.
IMDG: Not regulated as a dangerous good.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable.

15. Regulatory information

US federal regulations: This product is hazardous according to OSHA 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 (SARA)
Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance
Yes
SARA 311/312 Hazardous chemical
No

Other federal regulations
Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Not regulated.
Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.
Safe Drinking Water Act (SDWA)
Not regulated.
Drug Enforcement Administration (DEA), List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number
Not listed.
Drug Enforcement Administration (DEA), List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))
Not regulated.
DEA Exempt Chemical Mixtures Code Number
Not regulated.
Food and Drug Administration (FDA)
Not regulated.

US state regulations
This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Massachusetts RTK - Substance List
Glycerol (CAS 56-81-5)
New Jersey Worker and Community Right-to-Know Act
Not regulated.
Pennsylvania RTK - Hazardous Substances
Glycerol (CAS 56-81-5)
Rhode Island RTK
Glycerol (CAS 56-81-5)
California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT)
Not listed.

International Inventories
Country(s) or region
Inventory name
On inventory (yes/no)*
Australia
Australian Inventory of Chemical Substances (AICS)
Yes
Canada
Domestic Substances List (DSL)
Yes
Canada
Non-Domestic Substances List (NDSL)
No
China
Inventory of Existing Chemical Substances in China (IECSC)
Yes
Europe
EC Inventory
Yes
Japan
Inventory of Existing and New Chemical Substances (ENCS)
Yes
Korea
Existing Chemicals List (ECL)
Yes
New Zealand
New Zealand Inventory
Yes
Philippines
Philippine Inventory of Chemicals and Chemical Substances (PICCS)
Yes
United States & Puerto Rico
Toxic Substances Control Act (TSCA) Inventory
Yes

* A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information
Issue date
01/30/2016
Revision date
09/30/2016
Version
10
Further information
Not available.
References
IUCLID
Disclaimer
This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.
SAFETY DATA SHEET

1. Identification

Product identifier MEBSTAIN Apoptosis TUNEL Kit Direct
TdT

Other means of identification

Product code 8445
Recommended use Research use only.
Recommended restrictions None known.

Manufacturer / Importer / Supplier / Distributor information

Manufacturer and Supplier (Asia)
Medical & Biological Laboratories (MBL) Co., Ltd.
4-5-3 Sakae, Naka-ku, Nagoya, Aichi 460-0008, Japan
Telephone number +81-52-238-1901 (Monday to Friday, 9 AM to 5 PM JST)
Fax +81-52-238-1440
E-mail sds-support@mbl.co.jp
URL http://www.mbl.co.jp/e/index.html
Contact person SDS Support

Supplier MBL International Corporation
15A Constitution Way, Woburn, MA 01801, USA
Telephone number +1-800-200-5459, option 3
Fax +1-781-939-6963
E-mail tech@mblintl.com
URL http://www.mblintl.com/
Contact person Technical Service

2. Hazard(s) identification

Physical hazards Not classified.
Health hazards Carcinogenicity Category 1A
Environmental hazards Hazardous to the aquatic environment, acute hazard Category 1A
Hazardous to the aquatic environment, long-term hazard Category 3
OSHA hazard(s) Not classified.

Label elements

Hazard symbol

Signal word Danger
Hazard statement May cause cancer. Harmful to aquatic life with long lasting effects.
Precautionary statement
Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid release to the environment. Use personal protective equipment as required.
Response If exposed or concerned: Get medical advice/attention.
Storage Store locked up.
Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None.
Supplemental information None.

3. Composition/Information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
</table>
**4. First-aid measures**

**Inhalation**
Move to fresh air. Get medical attention if discomfort develops or persists.

**Skin contact**
Remove contaminated clothing. Wash with soap and water. Get medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

**Eye contact**
Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention if irritation develops or persists.

**Ingestion**
Rinse mouth thoroughly. Get medical attention if any discomfort occurs.

**Most important symptoms/effects, acute and delayed**
May cause temporary irritation on skin or eye on direct contact.

**Indication of immediate medical attention and special treatment needed**
Treat symptomatically.

**General information**
Get medical attention if any discomfort develops.

---

**5. Fire-fighting measures**

**Suitable extinguishing media**

**Unsuitable extinguishing media**
None known.

**Specific hazards arising from the chemical**
Fire or high temperatures create: Carbon oxides. Arsenic oxides.

**Special protective equipment and precautions for firefighters**
Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

**Fire-fighting equipment/instructions**
Move containers from fire area if you can do that without risk. Use water spray to cool unopened containers. Prevent entry to sewers and public waters.

---

**6. Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**
Ensure adequate ventilation. Avoid inhalation of mist and contact with skin and eyes. For personal protection, see Section 8 of the SDS.

**Methods and materials for containment and cleaning up**
Dike far ahead of liquid spill for later disposal. Small Spills: Absorb spillage with suitable absorbent material. Clean contaminated surface thoroughly. After removal, flush contaminated area thoroughly with water. Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so.

---

**7. Handling and storage**

**Precautions for safe handling**
Should be handled in closed systems, if possible. Obtain special instructions before use. Provide adequate ventilation. Pregnant women should not work with the product, if there is the least risk of exposure. Use work methods which minimize production of vapors and mists. Avoid inhalation of mist and contact with skin and eyes. Wash hands after handling. Observe good industrial hygiene practices.

**Conditions for safe storage, including any incompatibilities**
Keep container tightly closed. Store away from incompatible materials.

---

**8. Exposure controls/personal protection**

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Components</strong></td>
</tr>
<tr>
<td>Glycerol (Glycerin)</td>
</tr>
<tr>
<td>Potassium cacodylate</td>
</tr>
<tr>
<td>Sodium cacodylate</td>
</tr>
<tr>
<td>2-Mercaptoethanol</td>
</tr>
</tbody>
</table>

Composition comments: All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
MEBSTAIN Apoptosis TUNEL Kit Direct

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol (CAS 56-81-5)</td>
<td>TWA</td>
<td>10 mg/m³</td>
<td>Mist</td>
</tr>
</tbody>
</table>

**US. ACGIH Threshold Limit Values**

**Components**

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
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<tr>
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<td>10 mg/m³</td>
<td>Mist</td>
</tr>
</tbody>
</table>

**US. Workplace Environmental Exposure Level (WEEL) Guides**

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Mercaptoethanol (CAS 60-24-2)</td>
<td>TWA</td>
<td>0.6 mg/m³</td>
<td>0.2 ppm</td>
</tr>
</tbody>
</table>

**Biological limit values**

No biological exposure limits noted for the ingredient(s).

**Exposure guidelines**

**US WEEL Guides: Skin designation**

2-Mercaptoethanol (CAS 60-24-2) Can be absorbed through the skin.

**Appropriate engineering controls**

Provide adequate ventilation and minimise the risk of inhalation of vapours and mists.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection**

Wear safety glasses.

**Skin protection**

**Hand protection**

Wear protective gloves. Nitrile gloves are recommended, but be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.

**Other**

Wear appropriate clothing to prevent repeated or prolonged skin contact.

**Respiratory protection**

In case of inadequate ventilation or risk of inhalation of vapors, use suitable respiratory equipment with combination filter (gas filter/dust filter). Seek advice from local supervisor.

**General hygiene considerations**

Handle in accordance with good industrial hygiene and safety practice. Wash hands after handling. Routinely wash work clothing and protective equipment to remove contaminants. Observe any medical surveillance requirements.

**9. Physical and chemical properties**

**Appearance**

**Physical state**

Liquid.

**Form**

Viscous liquid.

**Color**

Colorless.

**Odor**

Faint.

**Odor threshold**

Not available.

**pH**

7.2 Neutral.

**Melting point/freezing point**

Not available.

**Initial boiling point and boiling range**

Not available.

**Flash point**

Not available.

**Evaporation rate**

Not available.

**Flammability (solid, gas)**

Not applicable.

**Upper/lower flammability or explosive limits**

- **Flammability limit - lower (%)**
  Not available.

- **Flammability limit - upper (%)**
  Not available.

**Vapor pressure**

Not available.

**Vapor density**

Not available.

**Relative density**

Not available.

**Solubility(ies)**

Soluble in water.

**Partition coefficient (n-octanol/water)**

Not available.

**Auto-ignition temperature**

Not available.

**Decomposition temperature**

Not available.
10. Stability and reactivity
Reactivity The product is stable and non-reactive under normal conditions of use, storage and
Chemical stability Stable at normal conditions.
Possibility of hazardous reactions None known.
Conditions to avoid Strong heating. Contact with incompatible materials.
Incompatible materials Strong oxidizing agents. Strong bases.
Hazardous decomposition products None known.

11. Toxicological information
Information on likely routes of exposure
Inhalation Under normal conditions of intended use, this material is not expected to be an inhalation hazard.
Skin contact May cause skin irritation.
Eye contact May cause eye irritation on direct contact.
Ingestion Ingestion may cause irritation and malaise.

Symptoms related to the physical, chemical and toxicological characteristics
Irritation of eyes and mucous membranes. Mild skin irritation.

Information on toxicological effects
Acute toxicity Large quantities: May cause discomfort if swallowed.

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol (CAS 56-81-5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Oral</td>
<td>LD50</td>
<td>Rat</td>
</tr>
<tr>
<td>Potassium cacodylate (CAS 21416-85-3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Oral</td>
<td>LD50</td>
<td>Mouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rat</td>
</tr>
<tr>
<td>Sodium cacodylate (CAS 124-65-2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Oral</td>
<td>LD50</td>
<td>Mouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rat</td>
</tr>
<tr>
<td>2-Mercaptoethanol (CAS 60-24-2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Oral</td>
<td>LD50</td>
<td>Rat</td>
</tr>
<tr>
<td>Dermal</td>
<td>LD50</td>
<td>Rabbit</td>
</tr>
<tr>
<td>Inhalation</td>
<td>LC50</td>
<td>Rat</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation May cause skin irritation.
Serious eye damage/eye irritation May cause eye irritation on direct contact.
Respiratory sensitization Not classified.
Skin sensitization Not a skin sensitizer.
Germ cell mutagenicity Not classified.
Carcinogenicity May cause cancer.

ACGIH Group A1: confirmed human carcinogen (listed as Arsenic).
IARC Group 2B: possibly carcinogenic to humans (listed as Arsenic).
NTP Group a: known to be human carcinogen.
Reproductive toxicity Not classified.
Specific target organ toxicity - single exposure Not classified.
Specific target organ toxicity - repeated exposure Not classified.
Aspiration hazard  Not classified.
Further information  Repeated ingestion or inhalation of arsenic compounds may adversely affect the skin, liver, circulatory system, upper respiratory tract and lungs.

12. Ecological information

Ecotoxicity  Harmful to aquatic life with long lasting effects.

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium cacodylate (CAS 21416-85-3)</td>
<td>Aquatic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crustacea</td>
<td>Water flea (<em>Daphnia magna</em>)</td>
</tr>
<tr>
<td>Sodium cacodylate (CAS 124-65-2)</td>
<td>Aquatic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crustacea</td>
<td>Water flea (<em>Daphnia magna</em>)</td>
</tr>
<tr>
<td>2-Mercaptoethanol (CAS 60-24-2)</td>
<td>Aquatic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crustacea</td>
<td>Water flea (<em>Daphnia magna</em>)</td>
</tr>
</tbody>
</table>

Persistence and degradability  The product is not expected to be readily biodegradable.

Bioaccumulative potential

Partition coefficient n-octanol / water (log $K_{ow}$)

- Glycerol (CAS 56-81-5)  -1.76
- 2-Mercaptoethanol (CAS 60-24-2)  -0.326

Mobility in soil  Expected to be highly mobile in soil.
Mobility in general  The product is water soluble and may spread in water systems.
Other adverse effects  No data available.

13. Disposal considerations

Disposal instructions  Dispose of in accordance with all applicable regulations. Do not discharge into drains, water courses or onto the ground.
Local disposal regulations  Dispose of in accordance with local regulations.
Hazardous waste code  Not regulated.
Waste from residues / unused products  Dispose of in accordance with local regulations.
Contaminated packaging  Dispose of in same manner as unused product.

14. Transport information

DOT  Not regulated as dangerous goods.
IATA  Not regulated as dangerous goods.
IMDG  Not regulated as dangerous goods.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code  Not applicable.

15. Regulatory information

US federal regulations  This product is not hazardous according to OSHA 29CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)  Not regulated.
CERCLA Hazardous Substance List (40 CFR 302.4)  Not listed.
Superfund Amendments and Reauthorization Act of 1986 (SARA)  Immediate Hazard - Yes
Hazard categories  Delayed Hazard - Yes
                     Fire Hazard - No
                     Pressure Hazard - No
                     Reactivity Hazard - No

SARA 302 Extremely hazardous substance
<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Reportable quantity</th>
<th>Threshold planning quantity</th>
<th>Threshold planning quantity, lower value</th>
<th>Threshold planning quantity, upper value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium cacodylate (CAS 124-65-2)</td>
<td>100</td>
<td>100 lbs</td>
<td>10,000 lbs</td>
<td></td>
</tr>
</tbody>
</table>

**SARA 311/312 Hazardous chemical**
SARA 313 (TRI reporting)

**Other federal regulations**
- Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
- Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
- Safe Drinking Water Act (SDWA)

**US state regulations**
- This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.
- Massachusetts RTK - Substance List
  - Glycerol (CAS 56-81-5)
  - Sodium cacodylate (CAS 124-65-2)
- New Jersey Worker and Community Right-to-Know Act
  - Glycerol (CAS 56-81-5)
  - Sodium cacodylate (CAS 124-65-2)
- Pennsylvania RTK - Hazardous Substances
  - Glycerol (CAS 56-81-5)
  - Sodium cacodylate (CAS 124-65-2)
- Rhode Island RTK
  - Sodium cacodylate (CAS 124-65-2)
- California Proposition 65
  - Not listed.

**International Inventories**

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>No</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>No</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>No</td>
</tr>
<tr>
<td>Europe</td>
<td>EC Inventory</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>No</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>No</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>No</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>No</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>No</td>
</tr>
</tbody>
</table>

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s). A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**16. Other information**

<table>
<thead>
<tr>
<th>Issue date</th>
<th>01/30/2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revision date</td>
<td>09/30/2016</td>
</tr>
<tr>
<td>Version</td>
<td>10</td>
</tr>
</tbody>
</table>
| List of abbreviations | EC50: Effective Concentration, 50%.
                      | LC50: Lethal Concentration, 50%.
                      | LD50: Lethal Dose, 50%.
| Further information| Not available.                  |
| References         | IUCLID                           |
| Disclaimer          | This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment. |
SAFETY DATA SHEET

1. Identification

Product identifier       MEBSTAIN Apoptosis TUNEL Kit Direct
Proteinase K, TB buffer (10x)

Other means of identification

Product code            8445
 Recommended use          Research use only.
 Recommended restrictions None known.

Manufacturer / Importer / Supplier / Distributor information

Manufacturer and Supplier (Asia)
Medical & Biological Laboratories (MBL) Co., Ltd.
4-5-3 Sakae, Naka-ku, Nagoya, Aichi 460-0008, Japan
Telephone number         +81-52-238-1901 (Monday to Friday, 9 AM to 5 PM JST)
Fax                     +81-52-238-1440
E-mail                  sds-support@mbl.co.jp
URL                     http://www.mbl.co.jp/e/index.html
Contact person          SDS Support

Supplier
MBL International Corporation
15A Constitution Way, Woburn, MA 01801, USA
Telephone number         +1-800-200-5459, option 3
Fax                     +1-781-939-6963
E-mail                  tech@mblintl.com
URL                     http://www.mblintl.com/
Contact person          Technical Service

2. Hazard(s) identification

Physical hazards            Not classified.
Health hazards              Not classified.
OSHA hazard(s)              Not classified.

Label elements

Hazard symbol              None.
Signal word                None.
Hazard statement           None.

Precautionary statement

Prevention               Observe good industrial hygiene practices.
Response                  Wash thoroughly after handling.
Storage                   None.
Disposal                  None.

Hazard(s) not otherwise classified (HNOC)

None.

3. Composition/Information on ingredients

Mixtures
The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

4. First-aid measures

Inhalation            Under normal conditions of intended use, this material is not expected to be an inhalation hazard.
Skin contact         Remove contaminated clothing. Dry skin with paper towel or similar. Get medical attention if irritation develops or persists.
Eye contact          Rinse immediately with plenty of water, also under the eyelids. Get medical attention if irritation develops or persists.
Ingestion

No adverse effects due to ingestion are expected. Get medical attention if any discomfort occurs.

Most important symptoms/effects, acute and delayed

Dry skin.

Indication of immediate medical attention and special treatment needed

Treat symptomatically.

General information

Get medical attention if any discomfort develops.

5. Fire-fighting measures

Suitable extinguishing media

Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media

None known.

Specific hazards arising from the chemical

None known.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing should be worn when fighting chemical fires. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.

Fire-fighting equipment/instructions

Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards

The product is non-combustible.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Avoid prolonged and repeated contact. Wear suitable protective clothing. For personal protection, see Section 8 of the SDS.

Methods and materials for containment and cleaning up

Absorb spillage with non-combustible, absorbent material. After removal, flush contaminated area thoroughly with water. For waste disposal, see Section 13 of the SDS.

Environmental precautions

Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling

Avoid prolonged and repeated contact. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep container closed.

8. Exposure controls/personal protection

Occupational exposure limits

No exposure limits noted for ingredient(s).

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Provide adequate ventilation.

Individual protection measures, such as personal protective equipment

Eye/face protection

If risk of splashing, wear safety goggles or face shield.

Skin protection

Wear protective gloves. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.

Hand protection

Wear protective gloves. Wear appropriate clothing to prevent repeated or prolonged skin contact.

Other

Respiratory protection

No protection is ordinarily required under normal conditions of use.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>pH</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>Not available</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>Not available</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td></td>
</tr>
<tr>
<td>- Flammability limit - lower (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>- Flammability limit - upper (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not available</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td>Soluble in water</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water)</td>
<td>Not available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

Reactivity  
The product is stable and non reactive under normal conditions of use, storage and

Chemical stability Stable at normal conditions.

Possibility of hazardous reactions None known.

Conditions to avoid None known.

Incompatible materials None known.

Hazardous decomposition products No hazard in normal industrial use.

11. Toxicological information

Information on likely routes of exposure

<table>
<thead>
<tr>
<th>Route</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingestion</td>
<td>Large quantities: May cause discomfort if swallowed.</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Under normal conditions of intended use, this material is not expected to be an inhalation hazard.</td>
</tr>
<tr>
<td>Skin contact</td>
<td>Prolonged contact may cause dryness of the skin.</td>
</tr>
<tr>
<td>Eye contact</td>
<td>Direct contact with eyes may cause temporary irritation.</td>
</tr>
</tbody>
</table>

Symptoms related to the physical, chemical and toxicological characteristics

Dry skin.

Information on toxicological effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>Large quantities: May cause discomfort if swallowed.</td>
</tr>
<tr>
<td>Skin corrosion/iritation</td>
<td>Prolonged contact may cause dryness of the skin.</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Direct contact with eyes may cause temporary irritation.</td>
</tr>
<tr>
<td>Respiratory sensitization</td>
<td>No data available.</td>
</tr>
<tr>
<td>Skin sensitization</td>
<td>Not a skin sensitizer.</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>No data available.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>No data available.</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>No data available.</td>
</tr>
</tbody>
</table>
Specific target organ toxicity - single exposure
No data available.

Specific target organ toxicity - repeated exposure
No data available.

Aspiration hazard
No data available.

12. Ecological information
Ecotoxicity
The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills have a harmful or damaging effect on the environment.

Persistence and degradability
No data available.

Bioaccumulative potential
No data available.

Mobility in soil
No data available.

Mobility in general
The product is water soluble and may spread in water systems.

Other adverse effects
No data available.

13. Disposal considerations
Disposal instructions
Dispose of in accordance with all applicable regulations. Do not discharge into drains, water courses or onto the ground.

Local disposal regulations
Dispose of in accordance with local regulations.

Hazardous waste code
Not regulated.

Waste from residues / unused products
Dispose of in accordance with local regulations.

Contaminated packaging
Dispose of in same manner as unused product.

14. Transport information
DOT
Not regulated as dangerous goods.

IATA
Not regulated as dangerous goods.

IMDG
Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable.

15. Regulatory information
US federal regulations
This product is not hazardous according to OSHA 29CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)
Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance
No

SARA 311/312 Hazardous chemical
No

SARA 313 (TRI reporting)
Not regulated.

Other federal regulations
Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.

Safe Drinking Water Act (SDWA)
Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number
Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))
Not regulated.
DEA Exempt Chemical Mixtures Code Number
Food and Drug Administration (FDA)
Not regulated.

US state regulations
This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Massachusetts RTK - Substance List
Not regulated.

New Jersey Worker and Community Right-to-Know Act
Not regulated.

Pennsylvania RTK - Hazardous Substances
Not regulated.

Rhode Island RTK
Not regulated.

California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT)
Not listed.

International Inventories

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>EC Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

Issue date 01/30/2016
Revision date 09/30/2016
Version 10
Further information Not available.
Disclaimer This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.