I. Identification

Chemicals name: DIMETHYL ETHER

Other Information:

Relevant identified uses of the substance or mixture and uses advised against: refrigerant, solvent, extractant, jet fuel, chemical (reaction medium), catalyst and stabilizer of polymerization reactions.

Information on Producer/Supplier Name, Addresses, Phone: Linyuan Factory, LCY Chemical Corp /
NO.11, Shihhua 3rd Rd., Linyuan District, Kaohsiung City, Taiwan (R.O.C )

Emergency Phone / Fax: (07) 6419966-137 / (07) 6410537

II. Hazard Identification:

Hazard Category: Class 1 flammable gas, Class 3 pressurized gas, skin corrosion/irritation substance, Class 2 severe injury/eye irritation substance, Class 3 Specific target organ systematic toxicity - Single exposure

Labeled Contents:

Symbols: Flame, high-pressure steel cylinder, exclamation point

Warning: Danger

Hazard Warning Information:

Highly flammable gas
Pressurized gas inside; may explode when exposed to heat
Slight skin irritation
Eye irritation
Potential fatigue or dizziness

Hazard Prevention Measures:

Place container in the cool area
Place container in the well-ventilated area
Keep away from inflammables. – Smoking prohibited
Prevent static electricity

Other Hazards: -

III. COMPOSITION OF MIXTURE
IV. First Aid Measures:

Emergency and First Aid Procedures:

Inhalation:
1. Move the patient to a place with fresh air. 2. If breathing stops, apply artificial respiration. 3. Supply oxygen if necessary. 4. Call physician to seek medical assistance.

Skin Contact:
1. If contacted with the liquid, use warm water (not above 40℃) to warm the frost area immediately. 2. If contacted with a large quantity of the liquid, shower with warm water after removing clothes. Call a physician for medical assistance.

Eye Contact:
1. If contacted with the liquid, use water to completely wash for more than 15 minutes immediately. 2. Seek medical attention immediately, to an ophthalmologist preferably.

Major Disease and Harm Effect: Oxygen deficiency symptoms.

First-Aid Personal Protection: Must wear Class C protective gear and perform emergency rescue in safe area.

Prompt to Doctor: If inhaled, oxygen should be considered.

V. Fire Fighting Measure:

Suitable Extinguishing Media: carbon dioxide, chemical powder, water spray or water mist

Special Exposure Hazards:
1. The vapor will float or spread through the air and may be ignited by an ignition source such as a flame, heater, or static electricity in the distant area.
2. The container may rupture or explode if exposed to heat.
3. Static electricity may accumulate when the substance flows, resulting in a risk of ignition.

Special Extinguishing Procedure:
1. If permitted by safety, remove the fire source and all containers. 2. With a spray of water to cool down, shut the valve to stop the leakage if safe. 3. Move the containers out of the fire site under safe conditions. 4. Use water mist to cool down the exposed tanks or containers in the fire site.

Special Protection Equipment: Fire fighters must wear chemical protective coats and air respirators (plus flash-proof aluminum coats if necessary).

VI. Accidental Release Measures:

Personal Protection:
1. Restrict the access to the area until the polluted area is cleaned completed.
2. Make sure the cleaning work is performed by trained personnel.
3. The personnel should wear appropriate personal protective equipment.

Environmental Protection:
1. The air in the area should be well ventilated.
2. All flammable sources should be eliminated.

Methods for Cleaning Up:
1. Evacuate all personnel from the danger area.
2. Remove all flammable sources under safe conditions.
3. Use fine water spray or water mist to reduce the amount of vapor.
4. Shut or stop all leakage under safe conditions.
5. Ventilate the leakage area or move the leaking containers to a well-ventilated area.

VII. Handling and Storage

Handling:
1. Caution! Gas and liquid can cause serious injury or even death.
2. Confirm compatibility with plastics prior to use.
3. Refer to the safety information on the general operation of compressed gas cylinders.
4. Do not work under a pressurized system.
5. In case of leakage, shut the cylinder value immediately. Ventilate the system and repair the leakage in the safe area.
6. Flammable; compressed gas will liquefy and may form an explosive mixture if mixed with air.
7. The container will rupture if heated. Do not allow the temperature of the container to exceed 40°C.
8. The container is preferably equipped with the pressure release device (safety valve) in order to release the content when the temperature rises.
9. All equipment should be connected to the ground.
10. Use fire-proof tools and explosion-proof equipment only.
11. Keep away from heat sources, sparks, and flames.
12. Use in a closed system only.
13. Keep away from oxidants.

Storage:
1. Proper ventilation is required for both storage and use.

VIII. Exposure Control / Personal Protection:

Engineering Control: 1. Explosion-proof local exhaust devices

<table>
<thead>
<tr>
<th>Control Factor</th>
<th>TWA</th>
<th>STEL</th>
<th>CEILING</th>
<th>BEIs</th>
</tr>
</thead>
</table>

Personal Protection Equipment:

Respiratory Protection: -
Hand Protection: 1. Wear frost-proof gloves when the skin must come in contact with the liquid.
Eye Protection: 1. Spill-proof goggles and face masks.
Skin & Body Protection: 1. Wearing safety shoes is required when operating the cylinders.
Hygiene Procedures:
1. Polluted clothes should be removed as soon as the work is completed. The clothes should be worn or discarded only after being washed. The washing staff should be informed of the harmful effects of the pollution.
2. Eating, drinking, and smoking are strictly prohibited in the work area.
3. Wash hands thoroughly after handling the substance.
4. Keep the work area clean.

IX. Physical and Chemical Properties / Characteristics:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>colorless gas</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>-</td>
</tr>
<tr>
<td>Odor</td>
<td>sweet</td>
</tr>
<tr>
<td>Melting Point</td>
<td>-141.5°C</td>
</tr>
<tr>
<td>pH Value</td>
<td></td>
</tr>
<tr>
<td>Boiling Point / Boiling Range</td>
<td>-24°C</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>flammable gas</td>
</tr>
<tr>
<td>Flash Point</td>
<td>-41°C</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>-</td>
</tr>
<tr>
<td>Test Method</td>
<td>Close cup</td>
</tr>
<tr>
<td>Spontaneous Temperature</td>
<td>350°C</td>
</tr>
<tr>
<td>Exposure Limits</td>
<td>3.4%~27.0%</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>3892mmHg @20°C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>1.6 (air = 1)</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.661 (water = 1)</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>7.6% (water)</td>
</tr>
<tr>
<td>Log Kow</td>
<td>0.10</td>
</tr>
<tr>
<td>Percent volatile</td>
<td>209 (butyl acetate = 1)</td>
</tr>
</tbody>
</table>

X. Stability and Reactivity:
Stability: unstable under normal conditions; may form explosive peroxides.

Special Conditions of Hazardous Reaction:
1. Aluminum hydride: carbon dioxide impurity may explode.
2. Lithium aluminum hydride: carbon dioxide impurity may explode.
3. Nitric acid, oxygen, oxidants and ozone: may explode.

Conditions to Avoid:
unstable peroxide may form if heated, left standing for too long, in the presence of oxygen.

Incompatibility:
oxidants, halides, acids, carbon monoxide, aluminum hydride, lithium aluminum hydride.

Hazardous Decomposition Products: -

XI. Toxicological Information
Exposure route: skin contact, inhalation, ingestion, eye contact.

Symptoms:
loss of coordination functions, blurred vision, headache, loss of painful sensation, loss of consciousness, cardiac arrhythmia, frostbite, headache, drowsiness, dim eyesight, excitement.

Acute Toxicity:

<table>
<thead>
<tr>
<th>Route</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>1. Chronic or large-area contact with the liquid may reach the harmful absorption amount. 2. Contact with the liquid can cause frostbite.</td>
</tr>
<tr>
<td>Inhalation</td>
<td>1. May lead to loss of coordination functions, blurred vision, headache, loss of painful sensation,</td>
</tr>
</tbody>
</table>
loss of consciousness, cardiac arrhythmia, inhibition of the central nervous system, or death due to oxygen deficiency.

**Ingestion:**
1. Liquid can cause frostbite to mouth and lips; may cause loss of coordination functions, blurred vision, headache, loss of pain sensation, loss of consciousness, and difficulty breathing.

**Eye:**
1. Vapor at high concentration can irritate eyes.
2. Contact with the liquid may lead to frostbite.

**LD50 (Test animal, absorption route):**
- 
**LC50 (Test animal, absorption route):** 308g/m3 (rat, inhalation)

**Chronic:**
1. Repeated exposure to the liquid can lead to cracked and dry skin.
2. Repeated inhalation can cause loss of appetite, fatigue, headache, drowsiness, blurred vision, excitement, and agitation.
3. Because the substance is able to remove fats, the aggravation of dermatitis may occur.

### XII. Ecological Information:

**Eco-toxicity:** LC50 (Fish):
- EC50 (aquatic invertebrates): -
- Bio-concentration Factor (BCF):

**Durability and Degradability:**
1. When released into the air, the estimated half-life after reacting with free hydroxyl radical and nitrate ion are 5.4 and 123 days, respectively.
2. When released into water, it will not be absorbed in the precipitates in the water. Instead, it will evaporate rapidly. Because it has a low bioconcentration, it is not easily hydrolyzed.

- **Half-life (air):** 528 hrs
- **Half-life (water surface):** 2.6~30 hrs
- **Half-life (underground water):**
- **Half-life (soil):**

**Biological Accumulation:** -

**Fluidity in the Soil:** when released into the soil, it is expected to be highly fluid and evaporate quickly from the surface.

**Other adverse effects:**

### XIII. Disposal Information:

**Disposal Information:**
1. Prevent the pollutants from polluting the surrounding environment.
2. Dispose all waste products, residues, waste containers or gaskets.

### XVI. Transport Information:

**The United Nations Number (Un-No):** 1033
**UN Transport Name:** Dimethyl Eter

**Transport Hazard Classification:** Class 2.1 Flammable Gas

**Packaging Category:** -

**Marine Pollutant (Yes/No):** No

**Special Transport Way and Note:** -

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**XV. Regulation Information:**

**Applicable Regulations:**

1. Enforcement Rules of the Occupational Safety and Health Act
2. Regulations of Hazard Communication on Dangerous and Harmful Material
3. Traffic Safety Regulations
4. Standards for the Storage, Clearance, and Disposal of Industrial Waste
5. Regulations of High-Pressure Gas Labor Safety
6. Public Hazardous Materials and Flammable Pressurized Gases Establishment Standards and Safety Control Regulations

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**XVI. Other Information:**

**References**

1. CCINFO Database, CCINFO CD, 2006-2
2. RTECS Database, TOMES PLUS CD, Vol.68, 2006
3. HSDB Database, TOMES PLUS CD, Vol.68, 2006
4. OHS MSDS ON DISC, Published by MDL, 2006

**Responsible Department**

Name: Linyuan Factory, **LCY Chemical Corp**

Address/Tel: NO.11, Shihhua 3rd Rd., Linyuan District, Kaohsiung City, Taiwan (R.O.C) / (07) 6419966-117

**Prepared by**

Job title: Industrial Safety Engineer, Name(signature and seal): Cash Chuang

**Date**

December 03, 2018

**Note**

This SDS version is intended for reference only.