1. Product and Company Identification

Material name: Allyl Alcohol

Revision date: 03-21-2010

CAS #: 107-18-6

MSDS Number: OC-1001 NA

Product use: Allyl Diglycol Carbonate, Allyl Glycidyl Ether, Allyl ester monomer, Allyl alcoxyletes, other

Manufacturer/Supplier: SHOWA DENKO K.K.
Organic Chemicals Department, Petrochemicals Division
13-9, Shiba Daimon 1-Chome, Minato-Ku, Tokyo 105-8518 Japan
sdk_org_chem@sdk.co.jp
Telephone +81-3-5470-3604

Emergency: Emergency telephone +81-97-521-5131 (Oita complex)

2. Hazards Identification

Physical state: Liquid.

Appearance: Transparent liquid

Emergency overview: DANGER! Flammable liquid and vapor. May be fatal if absorbed through skin. Harmful if inhaled or swallowed. Causes severe eye irritation. Causes skin irritation. Causes respiratory tract irritation. May cause damage to the liver.

Potential health effects:

- **Eyes**: Causes severe eye irritation. Lachrymation (discharge of tears).
- **Skin**: May be fatal if absorbed through skin. Causes skin irritation. Skin absorption can lead to serious systemic injury (periportal necrosis and congestion in the liver, hematuria, nephritis).
- **Inhalation**: Harmful if inhaled. Causes respiratory tract irritation. Vapors may cause drowsiness and dizziness.
- **Ingestion**: Harmful if swallowed. Swallowing or vomiting of the liquid may result in aspiration into the lungs.


Chronic effects: May cause damage to the liver and kidneys.

Signs and symptoms: Irritation.

Potential environmental effects: Very toxic to aquatic organisms.

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allyl alcohol</td>
<td>107-18-6</td>
<td>&gt; 99</td>
</tr>
</tbody>
</table>

4. First Aid Measures

First aid procedures:

- **Eye contact**: Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyes wide apart. Get medical attention immediately. Continue to rinse.
- **Skin contact**: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get immediate medical attention if symptoms occur after washing.
- **Inhalation**: Move injured person into fresh air and keep person calm under observation. Get medical attention if any discomfort continues.
- **Ingestion**: Rinse mouth thoroughly with water and give large amounts of milk or water, if person is conscious. Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs. Lay on the side. Get medical attention immediately.

Notes to physician: Symptoms may be delayed.

General advice: Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. If breathing is difficult, give oxygen.
5. Fire Fighting Measures

**Flammable properties**
The product is flammable, and heating may generate vapours which may form explosive vapour/air mixtures. During fire, gases hazardous to health may be formed.

**Extinguishing media**

<table>
<thead>
<tr>
<th>Suitable extinguishing media</th>
<th>Unsuitable extinguishing media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide, alcohol-resistant foam, dry chemical, water spray, or water fog.</td>
<td>No restrictions known.</td>
</tr>
</tbody>
</table>

**Protection of firefighters**

<table>
<thead>
<tr>
<th>Protective equipment and precautions for firefighters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of respiratory protection for fire fighting: follow the general fire precautions indicated in the workplace. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.</td>
</tr>
</tbody>
</table>

**Specific methods**

Use standard firefighting procedures and consider the hazards of other involved materials. Containers close to fire should be removed or cooled with water.

**Hazardous combustion products**
Carbon monoxide.

6. Accidental Release Measures

**Personal precautions**
Extinguish all ignition sources. Avoid sparks, flames, heat and smoking. Ventilate the area. Avoid inhalation of vapors and contact with skin and eyes. Wear suitable protective clothing. See Section 8 of the MSDS for Personal Protective Equipment.

**Environmental precautions**
Do not allow to enter drains, sewers or watercourses.

**Methods for cleaning up**
Remove sources of ignition. Absorb spillage with non-combustible, absorbent material. Containers with collected spillage must be properly labeled with correct contents and hazard symbol. For waste disposal, see Section 13 of the MSDS.

Large Spills: Stop the flow of material, if this is without risk. Vapors can be contained by covering the spill with foam or sheeting. Absorb with inert absorbent such as dry clay, sand or diatomaceous earth, commercial sorbents, or recover using pumps. Use clean non-sparking tools to collect absorbed material. Wash contact areas with soap and water.

7. Handling and Storage

**Handling**
Local exhaust is recommended. Avoid inhalation of spray mist and contact with skin and eyes. Wear approved safety goggles. Wear protective gloves and appropriate clothing to prevent skin contact. The product is flammable, and heating may generate vapors which may form explosive vapor/air mixtures. Vapors are heavier than air and may travel along the floor and in the bottom of containers. Do not smoke or use open fire or other sources of ignition. Ground container and transfer equipment to eliminate static electric sparks. Observe good industrial hygiene practices.

**Storage**
Follow rules for flammable liquids. Do not store near heat sources or expose to high temperatures. Keep away from heat, sparks and open flame. Keep container tightly closed in a cool, well-ventilated place. Keep under nitrogen. Store away from incompatible materials.

8. Exposure Controls / Personal Protection

<table>
<thead>
<tr>
<th>Occupational exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
</tr>
<tr>
<td>Material</td>
</tr>
<tr>
<td>Allyl alcohol (107-18-6)</td>
</tr>
<tr>
<td>U.S. - OSHA</td>
</tr>
<tr>
<td>Material</td>
</tr>
<tr>
<td>Allyl alcohol (107-18-6)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Canada - Alberta</td>
</tr>
<tr>
<td>Material</td>
</tr>
<tr>
<td>Allyl alcohol (107-18-6)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Canada - British Columbia</td>
</tr>
<tr>
<td>Material</td>
</tr>
<tr>
<td>Allyl alcohol (107-18-6)</td>
</tr>
</tbody>
</table>
Canada - Ontario
Material: Allyl alcohol (107-18-6)
Type: TWA
Value: 0.5 ppm

Canada - Quebec
Material: Allyl alcohol (107-18-6)
Type: STEL
Value: 9.5 mg/m³
Type: TWA
Value: 4 ppm
Value: 4.8 mg/m³
Value: 2 ppm

Mexico
Material: Allyl alcohol (107-18-6)
Type: STEL
Value: 10 mg/m³
Type: TWA
Value: 5 mg/m³
Value: 4 ppm
Value: 2 ppm

Engineering controls
Use explosion-proof equipment. Should be handled in closed systems, if possible. Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of vapors. Provide easy access to water supply and eye wash facilities.

Personal protective equipment
Eye / face protection
Chemical goggles and face shield are recommended.

Skin protection
Wear appropriate chemical resistant clothing to prevent any possibility of skin contact. Wear protective gloves. Nitrile rubber. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.

Respiratory protection
If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Use an organic vapor respirator for concentrations exceeding the Occupational Exposure Limit.

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 & Chemical Properties

Appearance: Transparent liquid
Color: Colorless.
Odor: Pungent.
Odor threshold: Not available.
Physical state: Liquid.
Form: Liquid.
pH: Not available.
Melting point: -200.2 °F (-129 °C)
Freezing point: -200.2 °F (-129 °C)
Boiling point: 206.4 °F (96.9 °C)
Flash point: 70.7 °F (21.5 °C) Tag Closed Cup
Evaporation rate: Not available.
Flammability (Heat of combustion): 1.85 kJ/mol
Flammability: Not available.
Flammability limits in air, upper, % by volume: 18 % v/v
Flammability limits in air, lower, % by volume: 2.5 % v/v
Vapor pressure: 2.4 kPa (20°C)
Vapor density: 2 (Air=1)
Specific gravity: 0.854 (20/4°C)
Solubility (water)  Completely soluble in water.
Partition coefficient (n-octanol/water)  0.17 log Pow
Auto-ignition temperature  829.4 °F (443 °C)
Decomposition temperature  Not available.
VOC  100 %
Viscosity  1.34 mPa·s @ 68 °F (20 °C)
Density  0.854 g/cm³
Percent volatile  100 %
Molecular weight  58.08 g/mol
Molecular formula  C₃H₆O

10. Chemical Stability & Reactivity Information

Chemical stability  Stable at normal conditions. Allyl alcohol can be oxidized under influence of (air)-oxygen to acrolein. Acrolein can react with allyl alcohol and form acrolein diallyl acetal. Allyl alcohol, having an unsaturated bond and a hydroxyl group, undergoes addition to the olefinic double bond and substitution of the hydroxyl group. Exothermic reaction with: Sodium hydroxide, Fluorine, Alkali metals, Hydrogen peroxide. Risk of explosion with: Alkali salts and alkaline earth compounds (chlorates), Sulfuric acid.

Conditions to avoid  Keep away from heat, sparks and open flame.


Hazardous decomposition products  Carbon monoxide.

Possibility of hazardous reactions  Will not occur.

11. Toxicological Information

Toxicological data

Product  Test Results
Allyl alcohol (107-18-6)  
Acute Dermal LD₅₀ Rabbit: 45 mg/kg
Acute Inhalation LC₅₀ Rat: 1060 ppm 1 Hours
Acute Inhalation LC₅₀ Rat: 165 ppm 4 Hours
Acute Inhalation LC₅₀ Rat: 76 ppm 8 Hours
Acute Inhalation LD₅₀ Monkey: 1000 ppm 4 hours
Acute Oral LD₅₀ Mouse: 96 g/kg
Acute Oral LD₅₀ Rabbit: 71 mg/kg
Acute Oral LD₅₀ Rat: 99 - 105 mg/kg
Acute Oral LD₅₀ Rat: 70 mg/kg
Acute Oral LD₅₀ Rat: 64 mg/kg
Acute Oral LD₅₀ Human: 0.43 mg/l

Acute effects  May be fatal if absorbed through skin. Causes severe eye irritation. Causes skin irritation. Skin absorption can lead to serious systemic injury (periportal necrosis and congestion in the liver, hematuria, nephritis). Harmful by inhalation and if swallowed. Causes respiratory tract irritation. Aspiration hazard: Swallowing or vomiting of the liquid may result in aspiration into the lungs. May cause damage to the liver.

Local effects  Lachrymation (discharge of tears).

US ACGIH Threshold Limit Values: Skin designation

Allyl alcohol (CAS 107-18-6)  Can be absorbed through the skin.

Sensitization  Not a skin sensitizer.

Chronic effects  May cause damage to the liver and kidneys.

Carcinogenicity  Not classified.
ACGIH Carcinogens
Allyl alcohol (CAS 107-18-6) A4 Not classifiable as a human carcinogen.

Mutagenicity Not classified.
Reproductive effects Not classified.

12. Ecological Information

Ecotoxicological data
Product
Allyl alcohol (107-18-6)

Test Results
EC50 Algae: 2.6 mg/l 72 Hours
EC50 Algae: 7.8 mg/l 72 Hours
EC50 Algae: 2.3 mg/l 72 Hours
EC50 Algae: 5.4 mg/l 72 Hours
EC50 Algae: 6.1 mg/l 72 Hours
EC50 Algae: >= 10 mg/l 72 Hours
EC50 Daphnia: 2.1 mg/l 48 Hours
LC50 Daphnia: 0.25 mg/l 96 Hours
LC50 Fathead minnow (Pimephales promelas): 0.32 mg/l 96 Hours
LC50 Goldfish (Carassius auratus): 1 mg/l 24 Hours
LC50 Oryzias latipes: 0.59 mg/l 96 Hours
NOEC Daphnia: 0.92 mg/l 21 days

Ecotoxicity Very toxic to aquatic organisms.
Persistence and degradability The product is readily biodegradable. BOD5: 1.79 g/g. COD: 2.12 g/g.
Bioaccumulation / Accumulation Not expected to bioaccumulate on the basis of the low octanol-water partition coefficient.
Partition coefficient (n-octanol/water) 0.17 log Pow
Mobility in environmental media The product is water soluble and may spread in water systems.

13. Disposal Considerations

Waste codes D001: Waste Flammable material with a flash point <140 °F
Disposal instructions Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.
Waste from residues / unused products Disposal recommendations are based on uncontaminated material.

14. Transport Information

DOT
Basic shipping requirements:
UN number UN1098
Proper shipping name Allyl alcohol
Hazard class 6.1
Subsidiary hazard class 3
Packing group Labels I
required Additional information: 6.1, 3
ERG number 131

IATA
Basic shipping requirements:
UN number 1098
Proper shipping name Allyl alcohol
Hazard class 6.1
Subsidiary hazard class 3
IMDG

Basic shipping requirements:
- UN number: 1098
- Proper shipping name: ALLYL ALCOHOL
- Hazard class: 6.1
- Subsidiary hazard class: 3
- Packing group: I
- Marine pollutant: Yes
- Environmental hazards: F-E, S-D

TDG

Basic shipping requirements:
- Proper shipping name: ALLYL ALCOHOL
- Hazard class: 6.1
- UN number: UN1098
- Packing group: I

15. Regulatory Information

US federal regulations

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity
- Allyl alcohol (CAS 107-18-6): 100 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity
- Allyl alcohol (CAS 107-18-6): 1000 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration
- Allyl alcohol (CAS 107-18-6): 1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

CERCLA (Superfund) reportable quantity (lbs)
- Allyl alcohol 100

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

Section 302 extremely hazardous substance
- Yes
Section 311 hazardous chemical: Yes

Clean Water Act (CWA): Hazardous substance

Drug Enforcement Agency (DEA): Not controlled

WHMIS status: Controlled

WHMIS classification:
- B2 - Flammable/Combustible
- D1A - Immediate/Serious-VERY TOXIC
- D2B - Other Toxic Effects-TOXIC

WHMIS labeling

Inventory status

<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>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</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>
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<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
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<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 that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations

US - California Hazardous Substances (Director's): Listed substance
Allyl alcohol (CAS 107-18-6) Listed.

US - Massachusetts RTK - Substance: Listed substance
Allyl alcohol (CAS 107-18-6) Listed.

US - New Jersey Community RTK (EHS Survey): Reportable threshold
Allyl alcohol (CAS 107-18-6) 500 LBS

US - New Jersey RTK - Substances: Listed substance
Allyl alcohol (CAS 107-18-6) Listed.

US - Pennsylvania RTK - Hazardous Substances: Listed substance
Allyl alcohol (CAS 107-18-6) Listed.

16. Other Information

Further information
EINECS No: 203-470-7

HMIS® ratings
Health: 3*
Flammability: 3
Physical hazard: 1

NFPA ratings
Health: 4
Flammability: 3
Instability: 1

Disclaimer
The information in this MSDS was obtained from sources which we believe are reliable, but no warranty or representation as to its accuracy or completeness is hereby given. Users should consider the information herein only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal, the safety and health of employees and customers and the protection of the environment.

Issue date
07-21-2010
This data sheet contains changes from the previous version in section(s):

First Aid Measures: General advice
Disposal Considerations: Waste codes
Other Information: Further information