SECTION 1: Identification

1.1. Identification

Product name : DIMETHYLALUMINUM CHLORIDE
Product code : OMAL024
Product form : Substance
Physical state : Liquid
Formula : C2H6AlCl
Synonyms : DIMETHYLCHLOROALANE
           : CHLORODIMETHYLALUMINUM
           : DIMETHYLCHLOROALUMINUM
Chemical family : METAL ALKYL

1.2. Recommended use and restrictions on use

Recommended use : Chemical intermediate

1.3. Supplier

GELEST, INC.
11 East Steel Road
Morrisville, PA 19067
USA
T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST
info@gelest.com - www.gelest.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification
- Flammable liquids Category 2
- Pyrophoric liquids Category 1
- Substances and mixtures which in contact with water emit flammable gases Category 1
- Skin corrosion/irritation Category 1B
- Serious eye damage/eye irritation Category 1

Hazard statements:
- H225 - Highly flammable liquid and vapor
- H250 - Catches fire spontaneously if exposed to air
- H260 - In contact with water releases flammable gases which may ignite spontaneously
- H314 - Causes severe skin burns and eye damage
- H318 - Causes serious eye damage

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US)

Signal word (GHS US) : Danger

Hazard statements (GHS US) :
- H225 - Highly flammable liquid and vapor
- H250 - Catches fire spontaneously if exposed to air
- H260 - In contact with water releases flammable gases which may ignite spontaneously
- H314 - Causes severe skin burns and eye damage
- H318 - Causes serious eye damage

Precautionary statements (GHS US) :
- P280 - Wear protective gloves/protective clothing/eye protection/face protection.
- P210 - Keep away from heat, sparks, open flames. - No smoking.
- P222 - Do not allow contact with air.
- P223 - Do not allow contact with water.
- P231+P232 - Handle under inert gas. Protect from moisture.
- P233 - Keep container tightly closed.
- P240 - Ground/Bond container and receiving equipment.
- P241 - Use explosion-proof electrical equipment.
- P242 - Use only non-sparking tools.
- P243 - Take precautionary measures against static discharge.
- P260 - Do not breathe vapors.
- P264 - Wash hands thoroughly after handling.
- P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting.
- P302+P334 - If on skin: Immerse in cool water/ wrap with wet bandages.
P303+P361+P353 - If on skin (or hair): take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 - Immediately call a doctor.
P321 - Specific treatment (see first aid instructions on this label).
P335+P334 - Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.
P363 - Wash contaminated clothing before reuse.
P370+P378 - In case of fire: Use dry chemical powder followed by sand or dolomite to extinguish.
P402+P404 - Store in a dry place. Store in a closed container.
P405 - Store locked up.
P422 - Store contents under inert gas.
P501 - Dispose of contents/container to licensed waste disposal facility.

2.3. Hazards not otherwise classified (HNOC)
No additional information available.

2.4. Unknown acute toxicity (GHS US)
Not applicable.

SECTION 3: Composition/Information on ingredients

3.1. Substances
Substance type: Mono-constituent
Name: DIMETHYLALUMINUM CHLORIDE
CAS-No.: 1184-58-3

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
</table>

Full text of hazard classes and H-statements: see section 16

3.2. Mixtures
Not applicable.

SECTION 4: First-aid measures

4.1. Description of first aid measures
First-aid measures general: Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.

First-aid measures after inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact: Wash with plenty of soap and water. Get immediate medical advice/attention.

First-aid measures after eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Get immediate medical advice/attention.

First-aid measures after ingestion: Never give anything by mouth to an unconscious person. Get medical advice/attention.

4.2. Most important symptoms and effects (acute and delayed)
Symptoms/effects: Causes severe skin burns and eye damage.

Symptoms/effects after inhalation: Direct respiratory contact is usually not possible, but will cause burns. Inhalation of combustion products can cause irritation.

Symptoms/effects after skin contact: Causes (severe) skin burns.

Symptoms/effects after eye contact: Causes serious eye damage.

Symptoms/effects after ingestion: May be harmful if swallowed.

4.3. Immediate medical attention and special treatment, if necessary
No additional information available.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media
Suitable extinguishing media: Dry chemical powder followed by sand or dolomite.

Unsuitable extinguishing media: Water.

5.2. Specific hazards arising from the chemical
Fire hazard: Pyrophoric liquid. Highly flammable liquid and vapor. Catches fire spontaneously if exposed to air. In contact with water releases flammable gases which may ignite spontaneously.
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Explosion hazard: Container explosion may occur during fire conditions. May form flammable/explosive vapor-air mixture.

5.3. Special protective equipment and precautions for fire-fighters
Firefighting instructions: If material is ignited, allow to burn. Exercise caution when fighting any chemical fire. In case of fire: Stop leak if safe to do so.
Protection during firefighting: Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapor and mist.
Other information: Concentrate containment efforts to adjacent combustibles. Fumes, self-heating on exposure to air, may ignite spontaneously in contact with.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
General measures: Eliminate every possible source of ignition. Use special care to avoid static electric charges.

6.1.1. For non-emergency personnel
Protective equipment: Wear protective equipment as described in Section 8.
Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders
Protective equipment: Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: “Exposure controls/personal protection”.
Emergency procedures: Stop release.

6.2. Environmental precautions
Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up
For containment: Concentrate containment efforts to adjacent combustibles.
Methods for cleaning up: Cover with dry chemical extinguishing powder, lime, sand or soda ash. Do not use water. Remove combustible materials in the vicinity of the spill. Allow time for decomposition or fire to burn out, then sweep material and transfer to a suitable container for disposal. Use only non-sparking tools.

6.4. Reference to other sections
See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Additional hazards when processed: Catches fire spontaneously if exposed to air. Handle empty containers with care because residual vapors are flammable. Keep away from any possible contact with water, because of violent reaction and possible flash fire.
Precautions for safe handling: Avoid all eye and skin contact and do not breathe vapor and mist. Do not allow contact with air. Do not allow contact with water. Ground/bond container and receiving equipment. Handle under inert gas. Protect from moisture. Handle only in sealed purged systems. Take precautionary measures against static discharge. Use only non-sparking tools. Use only outdoors or in a well-ventilated area.
Hygiene measures: Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for safe storage, including any incompatibilities
Technical measures: Laboratory and production areas must be equipped with special fire-extinguishing media for organometallics. Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof electrical equipment.
Information on mixed storage: Flammable and combustible materials should not be stored in or near working areas for pyrophorics.
Storage area: Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Dimethylaluminium chloride (1184-58-3)</th>
<th>ACGIH</th>
<th>ACGIH TWA (mg/m³)</th>
<th>2 mg/m³ aluminum alkyls as Al</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td></td>
<td>OSHA PEL (TWA) (mg/m³)</td>
<td>2 mg/m³ aluminum alkyls as Al</td>
</tr>
</tbody>
</table>

Print date: 04/10/2019
EN (English US)
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8.2. **Appropriate engineering controls**
Appropriate engineering controls: Glove box or sealed system under inert atmosphere is required. Provide local exhaust or general room ventilation.

8.3. **Individual protection measures/Personal protective equipment**

**Personal protective equipment:**
Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

**Hand protection:**
Neoprene or nitrile rubber gloves

**Eye protection:**
Full face shield with chemical workers goggles. Contact lenses should not be worn

**Skin and body protection:**
Wear suitable protective clothing. Fire resistant laboratory jacket or apron should be worn.

**Respiratory protection:**
Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified combination organic vapor/acid gas (yellow cartridge) respirator.

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**SECTION 9: Physical and chemical properties**

9.1. **Information on basic physical and chemical properties**

**Physical state:** Liquid

**Appearance:** Clear liquid. Ignites on exposure to air.

**Molecular mass:** 92.51 g/mol

**Color:** Colorless.

**Odor:** No data available

**Odor threshold:** No data available

**Refractive index:** No data available

**pH:** No data available

**Relative evaporation rate (butyl acetate=1):** No data available

**Melting point:** 15 °C

**Freezing point:** No data available

**Boiling point:** 126 - 127 °C

**Flash point:** -18 °C

**Auto-ignition temperature:** No data available

**Decomposition temperature:** No data available

**Flammability (solid, gas):** Pyrophoric liquid. Highly flammable liquid and vapor. Catches fire spontaneously if exposed to air. In contact with water releases flammable gases which may ignite spontaneously

**Vapor pressure:** No data available

**Relative vapor density at 20 °C:** > 1

**Relative density:** 0.996 @ 25°C

**Solubility:** Reacts violently with water.

**Log Pow:** No data available

**Log Kow:** No data available

**Viscosity, kinematic:** No data available

**Viscosity, dynamic:** No data available

**Explosive properties:** No data available

**Oxidizing properties:** No data available

**Explosion limits:** No data available

9.2. **Other information**
No additional information available

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**SECTION 10: Stability and reactivity**

10.1. **Reactivity**
No additional information available

10.2. **Chemical stability**
Stable in sealed containers stored under a dry inert atmosphere.

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Print date: 04/10/2019

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10.3. Possibility of hazardous reactions
Catches fire spontaneously if exposed to air.

10.4. Conditions to avoid
Heat. Sparks. Open flame. Do not allow contact with air.

10.5. Incompatible materials

10.6. Hazardous decomposition products

SECTION 11: Toxicological information

11.1. Information on toxicological effects

| Acute toxicity | Not classified |
| Skin corrosion/irritation | Causes severe skin burns and eye damage. |
| Serious eye damage/irritation | Causes serious eye damage. |
| Respiratory or skin sensitization | Not classified |
| Germ cell mutagenicity | Not classified |
| Carcinogenicity | None of the components in this product at concentrations >0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen. |
| Reproductive toxicity | Not classified |
| Specific target organ toxicity – single exposure | Not classified |
| Specific target organ toxicity – repeated exposure | May cause damage to organs through prolonged or repeated exposure |
| Aspiration hazard | Not classified |
| Symptoms/effects after inhalation | Direct respiratory contact is usually not possible, but will cause burns. Inhalation of combustion products can cause irritation. |
| Symptoms/effects after skin contact | Causes (severe) skin burns. |
| Symptoms/effects after eye contact | Causes serious eye damage. |
| Symptoms/effects after ingestion | May be harmful if swallowed. |

SECTION 12: Ecological information

12.1. Toxicity
No additional information available

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
No additional information available

12.4. Mobility in soil
No additional information available

12.5. Other adverse effects
Other adverse effects | This substance may be hazardous to the environment. |
Effect on the ozone layer | No additional information available |

SECTION 13: Disposal considerations

13.1. Disposal methods

| Sewage disposal recommendations | Do not dispose of waste into sewer. |
| Product/Packaging disposal recommendations | Incinerate. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility. This is a RCRA hazardous waste: 40 CFR 261.21 (i.e. ignitable) 40 CFR 261.23 (i.e. reactive). |
| Additional information | Handle empty containers with care because residual vapors are flammable. |
| Ecology - waste materials | Avoid release to the environment. |
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SECTION 14: Transport information

14.1. UN number
UN-No.(DOT) : 3394
DOT NA no. : UN3394

14.2. UN proper shipping name
Transport document description : UN3394 Organometallic substance, liquid, pyrophoric, water-reactive (DIMETHYLALUMINUM CHLORIDE), 4.2 (4.3), I
Proper Shipping Name (DOT) : Organometallic substance, liquid, pyrophoric, water-reactive
(DIMETHYLALUMINUM CHLORIDE)
Class (DOT) : 4.2 - Class 4.2 - Spontaneously combustible material 49 CFR 173.124
Packing group (DOT) : I - Great Danger
Hazard labels (DOT) : 4.2 - Spontaneously combustible
4.3 - Dangerous when wet

DOT Packaging Non Bulk (49 CFR 173.xxx) : 181
DOT Packaging Bulk (49 CFR 173.xxx) : 244
DOT Packaging Exceptions (49 CFR 173.xxx) : None
DOT Symbols : G - Identifies PSN requiring a technical name

14.3. Additional information
Emergency Response Guide (ERG) Number : 135
Other information : No supplementary information available.

Transport by sea
DOT Vessel Stowage Location : D - The material must be stowed “on deck only” on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other : 13 - Keep as dry as reasonably practicable,52 - Stow “separated from” acids,78 - Stow “separated longitudinally by an intervening complete compartment or hold from” explosives

Air transport
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : Forbidden

SECTION 15: Regulatory information

15.1. US Federal regulations

Dimethylaluminium chloride (1184-58-3)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Dimethylaluminium chloride (1184-58-3)
Listed on the Canadian NDSL (Non-Domestic Substances List)

EU-Regulations

Dimethylaluminium chloride (1184-58-3)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations

Dimethylaluminium chloride (1184-58-3)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
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15.3. US State regulations
California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

Full text of H-phrases:

<table>
<thead>
<tr>
<th>H225</th>
<th>Highly flammable liquid and vapor</th>
</tr>
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<td>Causes severe skin burns and eye damage</td>
</tr>
<tr>
<td>H318</td>
<td>Causes serious eye damage</td>
</tr>
</tbody>
</table>

Abbreviations and acronyms

Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor.

Hazard Rating

Health:
3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

Flammability:
4 Severe Hazard - Flammable gases, or very volatile flammable liquids with flash points below 73 F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class IA)

Physical:
2 Moderate Hazard - Materials that are unstable and may undergo violent chemical changes at normal temperature and pressure with low risk for explosion. Materials may react violently with water or form peroxides upon exposure to air.

Prepared by safety and environmental affairs.

Date of issue: 09/20/2017 Version: 1.0

SDS US (GHS HazCom 2012) - Custom

According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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