

**Safety Data Sheet**  
according to OSHA HCS

Printing date 06/19/2015

Reviewed on 06/19/2015

**1 Identification**

- **Product name**
- **Trade name:** Trimethylaluminum, min. 98%, 93-1360, contained in 50 ml Swagelok® cylinder (96-1070) for CVD/ALD
- **Item number:** 98-4003
- **CAS Number:** 75-24-1
- **EC number:** 200-853-0
- **Index number:** 013-004-00-2
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**  
Strem Chemicals, Inc.  
7 Mulliken Way  
NEWBURYPORT, MA 01950  
USA  
info@strem.com
- **Information department:** Technical Department
- **Emergency telephone number:**  
EMERGENCY: CHEMTREC: + 1 (800) 424-9300  
During normal opening times: +1 (978) 499-1600

**2 Hazard(s) identification**

- **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 1 H224 Extremely flammable liquid and vapour.

Pyr. Liq. 1 H250 Catches fire spontaneously if exposed to air.

Water-react. 1 H260 In contact with water releases flammable gases which may ignite spontaneously.



GHS05 Corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.

- **Label elements**
- **GHS label elements**  
The substance is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**



GHS02



GHS05

- **Signal word** *Danger*
- **Hazard-determining components of labeling:**  
trimethylaluminium

(Contd. on page 2)

**Safety Data Sheet**  
according to OSHA HCS

Printing date 06/19/2015

Reviewed on 06/19/2015

**Trade name: Trimethylaluminum, min. 98%, 93-1360, contained in 50 ml Swagelok® cylinder (96-1070) for CVD/ALD**

(Contd. of page 1)

**· Hazard statements**

- H224 *Extremely flammable liquid and vapour.*
- 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.*

**· Precautionary statements**

- P101 *If medical advice is needed, have product container or label at hand.*
- P102 *Keep out of reach of children.*
- P103 *Read label before use.*
- P231+P232 *Handle under inert gas. Protect from moisture.*
- P301+P310 *IF SWALLOWED: Immediately call a POISON CENTER/ doctor.*
- P303+P361+P353 *IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.*
- P305+P351+P338 *IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
- P403+P233 *Store in a well-ventilated place. Keep container tightly closed.*
- P422 *Store contents under inert gas.*
- P501 *Dispose of contents/container in accordance with local/regional/national/international regulations.*

**· Classification system:**

**· NFPA ratings (scale 0 - 4)**



*The substance demonstrates unusual reactivity with water.*

**· HMIS-ratings (scale 0 - 4)**



**· Other hazards**

- Results of PBT and vPvB assessment**
- PBT:** Not applicable.
- vPvB:** Not applicable.

**3 Composition/information on ingredients**

- Chemical characterization: Substances**
- CAS No. Description**  
75-24-1 trimethylaluminium
- Identification number(s)**
- EC number:** 200-853-0
- Index number:** 013-004-00-2

**4 First-aid measures**

- Description of first aid measures**
- General information:** Immediately remove any clothing soiled by the product.

(Contd. on page 3)

**Safety Data Sheet**  
according to OSHA HCS

Printing date 06/19/2015

Reviewed on 06/19/2015

**Trade name: Trimethylaluminum, min. 98%, 93-1360, contained in 50 ml Swagelok® cylinder (96-1070) for CVD/ALD**

(Contd. of page 2)

- **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing:** Drink copious amounts of water and provide fresh air. Immediately call a doctor.
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**  
No further relevant information available.

### 5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**  
CO<sub>2</sub>, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **For safety reasons unsuitable extinguishing agents:** Water
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** No special measures required.

### 6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**  
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:** Prevent seepage into sewage system, workpits and cellars.
- **Methods and material for containment and cleaning up:**  
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).  
Use neutralizing agent.  
Dispose contaminated material as waste according to item 13.  
Ensure adequate ventilation.  
Do not flush with water or aqueous cleansing agents
- **Reference to other sections**  
See Section 7 for information on safe handling.  
See Section 8 for information on personal protection equipment.  
See Section 13 for disposal information.

### 7 Handling and storage

- **Precautions for safe handling** No special precautions are necessary if used correctly.
- **Information about protection against explosions and fires:** Keep ignition sources away - Do not smoke.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:**  
Keep receptacle tightly sealed.  
Store in cool, dry conditions in well sealed receptacles.
- **Specific end use(s)** No further relevant information available.

USA

(Contd. on page 4)

**Safety Data Sheet**  
according to OSHA HCS

Printing date 06/19/2015

Reviewed on 06/19/2015

**Trade name: Trimethylaluminum, min. 98%, 93-1360, contained in 50 ml Swagelok® cylinder (96-1070) for CVD/ALD**

(Contd. of page 3)

**8 Exposure controls/personal protection**

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**

**75-24-1 trimethylaluminium**

REL Long-term value: 2 mg/m<sup>3</sup>  
as Al

TLV Long-term value: 1\* mg/m<sup>3</sup>  
as Al; \*as respirable fraction

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**

· **Personal protective equipment:**

· **General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

· **Breathing equipment:** Not required.

· **Protection of hands:**



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· **Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· **Eye protection:**



Tightly sealed goggles

**9 Physical and chemical properties**

· **Information on basic physical and chemical properties**

· **General Information**

· **Appearance:**

Form: Liquid

Color: Colorless

· **Odor:** Unpleasant

(Contd. on page 5)

**Safety Data Sheet**  
according to OSHA HCS

Printing date 06/19/2015

Reviewed on 06/19/2015

**Trade name: Trimethylaluminum, min. 98%, 93-1360, contained in 50 ml Swagelok® cylinder (96-1070) for CVD/ALD**

(Contd. of page 4)

· <b>Odour threshold:</b>	Not determined.
· <b>pH-value:</b>	Not determined.
· <b>Change in condition</b>	
<b>Melting point/Melting range:</b>	15.4 °C (60 °F)
<b>Boiling point/Boiling range:</b>	Undetermined.
· <b>Flash point:</b>	Not applicable.
· <b>Flammability (solid, gaseous):</b>	Not applicable.
· <b>Ignition temperature:</b>	
<b>Decomposition temperature:</b>	Not determined.
· <b>Auto igniting:</b>	Spontaneously flammable in air.
· <b>Danger of explosion:</b>	Not determined.
· <b>Explosion limits:</b>	
<b>Lower:</b>	Not determined.
<b>Upper:</b>	Not determined.
· <b>Vapor pressure at 20 °C (68 °F):</b>	9mm (20 °C hPa (7mm (15 °C mm Hg)
· <b>Density at 20 °C (68 °F):</b>	0.752 g/cm <sup>3</sup> (6.275 lbs/gal) (20°)
· <b>Relative density</b>	Not determined.
· <b>Vapour density</b>	Not determined.
· <b>Evaporation rate</b>	Not determined.
· <b>Solubility in / Miscibility with</b>	
<b>Water:</b>	Not miscible or difficult to mix.
· <b>Partition coefficient (n-octanol/water):</b>	Not determined.
· <b>Viscosity:</b>	
<b>Dynamic:</b>	Not determined.
<b>Kinematic:</b>	Not determined.
<b>Organic solvents:</b>	0.0 %
· <b>Other information</b>	No further relevant information available.

**10 Stability and reactivity**

- **Reactivity**
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

USA

(Contd. on page 6)

**Safety Data Sheet**  
according to OSHA HCS

Printing date 06/19/2015

Reviewed on 06/19/2015

**Trade name: Trimethylaluminum, min. 98%, 93-1360, contained in 50 ml Swagelok® cylinder (96-1070) for CVD/ALD**

(Contd. of page 5)

**11 Toxicological information**

- **Information on toxicological effects**
- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Caustic effect on skin and mucous membranes.
- **on the eye:** Strong caustic effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**  
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**

Substance is not listed.

· **NTP (National Toxicology Program)**

Substance is not listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

**12 Ecological information**

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:** Must not reach bodies of water or drainage ditch undiluted or unneutralized.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

**13 Disposal considerations**

- **Waste treatment methods**
- **Recommendation:**  
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

**14 Transport information**

- **UN-Number**
- **DOT, IMDG, IATA** UN3394

(Contd. on page 7)

**Safety Data Sheet**  
according to OSHA HCS

Printing date 06/19/2015

Reviewed on 06/19/2015

**Trade name: Trimethylaluminum, min. 98%, 93-1360, contained in 50 ml Swagelok® cylinder (96-1070) for CVD/ALD**

(Contd. of page 6)

· **UN proper shipping name**  
· **DOT**  
· **IMDG, IATA**

Organometallic substance, liquid, pyrophoric, water-reactive  
ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC,  
WATER- REACTIVE

· **Transport hazard class(es)**  
· **DOT**



· **Class**  
· **Label**

4.2 Substances liable to spontaneous combustion  
4.2+4.3

· **IMDG, IATA**



· **Class**  
· **Label**

4.2 Substances liable to spontaneous combustion  
4.2+4.3

· **Packing group**  
· **DOT, IMDG, IATA**

I

· **Environmental hazards:**  
· **Marine pollutant:**

No

· **Special precautions for user**  
· **EMS Number:**

Not applicable.  
F-G,S-M

· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not applicable.

· **Transport/Additional information:**

· **DOT**  
· **Quantity limitations**

On passenger aircraft/rail: Forbidden  
On cargo aircraft only: Forbidden

· **IMDG**  
· **Limited quantities (LQ)**  
· **Excepted quantities (EQ)**

0  
Code: E0  
Not permitted as Excepted Quantity

· **UN "Model Regulation":**

UN3394, Organometallic substance, liquid, pyrophoric, water-reactive, 4.2 (4.3), I

USA

(Contd. on page 8)



**Safety Data Sheet**  
according to OSHA HCS

Printing date 06/19/2015

Reviewed on 06/19/2015

**Trade name: Trimethylaluminum, min. 98%, 93-1360, contained in 50 ml Swagelok® cylinder (96-1070) for CVD/ALD**

(Contd. of page 7)

**15 Regulatory information**

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

· **Section 355 (extremely hazardous substances):**

Substance is not listed.

· **Section 313 (Specific toxic chemical listings):**

Substance is not listed.

· **TSCA (Toxic Substances Control Act):**

Substance is listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for females:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for males:**

Substance is not listed.

· **Chemicals known to cause developmental toxicity:**

Substance is not listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**

Substance is not listed.

· **TLV (Threshold Limit Value established by ACGIH)**

Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

Substance is not listed.

· **GHS label elements**

The substance is classified and labeled according to the Globally Harmonized System (GHS).

· **Hazard pictograms**



GHS02 GHS05

· **Signal word Danger**

· **Hazard-determining components of labeling:**

trimethylaluminium

· **Hazard statements**

H224 Extremely flammable liquid and vapour.

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.

· **Precautionary statements**

P101 If medical advice is needed, have product container or label at hand.

P102 Keep out of reach of children.

(Contd. on page 9)



**Safety Data Sheet**  
according to OSHA HCS

Printing date 06/19/2015

Reviewed on 06/19/2015

**Trade name: Trimethylaluminum, min. 98%, 93-1360, contained in 50 ml Swagelok® cylinder (96-1070) for CVD/ALD**

(Contd. of page 8)

- P103 *Read label before use.*
- P231+P232 *Handle under inert gas. Protect from moisture.*
- P301+P310 *IF SWALLOWED: Immediately call a POISON CENTER/ doctor.*
- P303+P361+P353 *IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.*
- P305+P351+P338 *IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
- P403+P233 *Store in a well-ventilated place. Keep container tightly closed.*
- P422 *Store contents under inert gas.*
- P501 *Dispose of contents/container in accordance with local/regional/national/international regulations.*
- **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

### 16 Other information

*This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.*

- **Department issuing SDS:** Technical Department.
- **Contact:** Technical Director
- **Date of preparation / last revision** 06/19/2015 / -
- **Abbreviations and acronyms:**

*ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)*

*IMDG: International Maritime Code for Dangerous Goods*

*DOT: US Department of Transportation*

*IATA: International Air Transport Association*

*ACGIH: American Conference of Governmental Industrial Hygienists*

*EINECS: European Inventory of Existing Commercial Chemical Substances*

*CAS: Chemical Abstracts Service (division of the American Chemical Society)*

*NFPA: National Fire Protection Association (USA)*

*HMIS: Hazardous Materials Identification System (USA)*

*Flam. Liq. 1: Flammable liquids, Hazard Category 1*

*Pyr. Liq. 1: Pyrophoric Liquids, Hazard Category 1*

*Water-react. 1: Substances and Mixtures which, in contact with water, emit flammable gases, Hazard Category 1*

*Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B*