TITANIUM TETRAKIS(DIETHYLAMIDE), 99+%  
Safety Data Sheet OMTI075  
Date of issue: 05/27/2016  
Version: 1.0

SECTION 1: Identification

1.1. Identification  
Product name: TITANIUM TETRAKIS(DIETHYLAMIDE), 99+%  
Product code: OMTI075  
Product form: Substance  
Physical state: Liquid  
Formula: C16H40N4Ti  
Synonyms: TETRAKIS(DIETHYLAMIDO)TITANIUM; TDEAT  
Chemical family: METAL-ORGANIC

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 3  
- Skin corrosion/irritation Category 1B  
- Serious eye damage/eye irritation Category 1  
- Specific target organ toxicity (single exposure) Category 3  
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):  
  - H226 - Flammable liquid and vapor  
  - H314 - Causes severe skin burns and eye damage  
  - H318 - Causes serious eye damage  
  - H335 - May cause respiratory irritation
- Precautionary statements (GHS US):  
  - P280 - Wear protective gloves/protective clothing/eye protection/face protection.  
  - P301 - Immediately call a doctor  
  - P210 - Keep away from heat, open flames, sparks. - No smoking.  
  - 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.  
  - P271 - Use only outdoors or in a well-ventilated area.  
  - P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting  
  - P303+P361+P335 - 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  
  - P312 - Call a doctor if you feel unwell  
  - P321 - Specific treatment (see first aid instructions on this label)  
  - P363 - Wash contaminated clothing before reuse.  
  - P370+P378 - In case of fire: Use alcohol resistant foam, carbon dioxide, dry chemical to
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2.3. Hazards not otherwise classified (HNOC)

Other hazards not contributing to the classification: Additional diethylamine may be formed by reaction with moisture and water. The US OSHA PEL (TWA) for diethylamine is 25 ppm.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type: Mono-constituent

Name: TITANIUM TETRAKIS(DIETHYLAMIDE), 99+%  
CAS-No.: 4419-47-0

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
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<tr>
<td>Titanium tetrakis(diethylamide)</td>
<td>(CAS-No.) 4419-47-0</td>
<td>99 - 100</td>
<td>Flam. Liq. 3, H226</td>
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<td>Skin Corr. 1B, H314</td>
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<td>Eye Dam. 1, H318</td>
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<td>STOT SE 3, H335</td>
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</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. Remove contact lenses, if present and easy to do. Continue rinsing. 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 after inhalation: May cause respiratory 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


Unsuitable extinguishing media: Do not use straight streams.

5.2. Specific hazards arising from the chemical

Fire hazard: Flammable liquid and vapor. Irritating fumes of diethylamine and organic acid vapors may develop when material is exposed to water or open flame.

Explosion hazard: May form flammable/explosive vapor-air mixture.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions: Exercise caution when fighting any chemical fire. Use water spray to cool exposed surfaces.

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.

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.
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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".

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: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.  
Methods for cleaning up: Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate 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: Handle empty containers with care because residual vapors are flammable. Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Precautions for safe handling: Avoid all eye and skin contact and do not breathe vapor and mist. Ground/bond container and receiving equipment. Provide good ventilation in process area to prevent accumulation of vapors. Take precautionary measures against static discharge. Use only non-sparking tools.

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: Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof electrical equipment.

Storage conditions: Keep container tightly closed. Keep in a cool place. Store locked up.


Storage area: Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters  
No additional information available

8.2. Appropriate engineering controls  
Appropriate engineering controls: 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:  
Chemical goggles or face shield. Contact lenses should not be worn

Skin and body protection:  
Wear suitable protective clothing

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.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties  
Physical state: Liquid
Appearance: Liquid.
Molecular mass: 336.4 g/mol
Color: Orange-amber.
Odor: Acrid. Amine.
Odor threshold: No data available
Refractive index: 1.536
pH: No data available
Relative evaporation rate (butyl acetate=1): No data available
Melting point: No data available
Freezing point: < 0 °C
Boiling point: 133 °C @ 1.2 mm Hg
Flash point: 37 °C
Auto-ignition temperature: No data available
Decomposition temperature: No data available
Flammability (solid, gas): Flammable liquid and vapor
Vapor pressure: 0.035 mm Hg @ 40°C
Relative vapor density at 20 °C: > 1
Relative density: 0.938
Solubility: Reacts 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

**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.

10.3. **Possibility of hazardous reactions**
Reacts with water and moisture in air, liberating diethylamine.

10.4. **Conditions to avoid**
Heat. Open flame. Sparks.

10.5. **Incompatible materials**

10.6. **Hazardous decomposition products**
Diethylamine. Organic acid vapors.

**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: Not classified
Reproductive toxicity: Not classified
Specific target organ toxicity – single exposure: May cause respiratory irritation.
Specific target organ toxicity – repeated exposure: Not classified
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Aspiration hazard : Not classified  
Symptoms/effects after inhalation : May cause respiratory 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.  
Reason for classification : Expert judgment

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 : Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.  
Additional information : Handle empty containers with care because residual vapors are flammable.  
Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number  
UN-No.(DOT) : 2920  
DOT NA no. : UN2920

14.2. UN proper shipping name  
Transport document description : UN2920 Corrosive liquids, flammable, n.o.s. (TITANIUM TETRAKIS(DIETHYLAMIDE)), 8 (3), II  
Proper Shipping Name (DOT) : Corrosive liquids, flammable, n.o.s. (TITANIUM TETRAKIS(DIETHYLAMIDE))  
Class (DOT) : 8 - Class 8 : Corrosive material 49 CFR 173.136  
Packing group (DOT) : II - Medium Danger  
Hazard labels (DOT) : 8 - Corrosive  
3 - Flammable liquid

DOT Packaging Non Bulk (49 CFR 173.xxx) : 202  
DOT Packaging Bulk (49 CFR 173.xxx) : 243  
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 : 132  
Other information : No supplementary information available.

Transport by sea  
DOT Vessel Stowage Location : C - The material must be stowed “on deck only” on a cargo vessel and on a passenger vessel.  
DOT Vessel Stowage Other : 25 - Protected from sources of heat, 40 - Stow “clear of living quarters”
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Air transport
DOT Quantity Limitations Passenger aircraft/rail : 1 L (49 CFR 173.27)
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)

SECTION 15: Regulatory information

15.1. US Federal regulations

Titanium tetrakis(diethylamide) (4419-47-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA
Titanium tetrakis(diethylamide) (4419-47-0)
Listed on the Canadian NDSL (Non-Domestic Substances List)

EU-Regulations
Titanium tetrakis(diethylamide) (4419-47-0)
Listed on ELINCS (European List of Notified Chemical Substances)

National regulations
Titanium tetrakis(diethylamide) (4419-47-0)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

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:
-
H226 Flammable liquid and vapor
H314 Causes severe skin burns and eye damage
H318 Causes serious eye damage
H335 May cause respiratory irritation

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
: 3 Serious Hazard - Materials capable of ignition under almost all normal temperature conditions. Includes flammable liquids with flash points below 73 F and boiling points above 100 F. as well as liquids with flash points between 73 F and 100 F. (Classes IB & IC)

Physical
: 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Prepared by safety and environmental affairs.

Date of issue: 05/27/2016 Version: 1.0

SDS US (GHS HazCom 2012) - Custom
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According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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