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

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

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

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Use of the substance/mixture: Chemical intermediate

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

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

GELEST INC.
Fritz-Klatte-Strasse 8  
65933 Frankfurt  
Germany
T +49 (0) 69 3535106-500 - F +49 (0) 69 3535106-501 - (M-F): 8:00 AM - 4:00 PM
info@gelestde.com - www.gelestde.com

1.4. Emergency telephone number

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

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]
Flammable liquids, Category 3  
Skin corrosion/irritation, Category 1B  
Serious eye damage/eye irritation, Category 1  
Specific target organ toxicity — Single exposure, Category 3  
Respiratory tract irritation
Full text of H statements: see section 16

Adverse physicochemical, human health and environmental effects
No additional information available

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP):  
- GHS02  
- GHS05  
- GHS07

Signal word (CLP): Danger
Hazard statements (CLP): H226 - Flammable liquid and vapour.
H314 - Causes severe skin burns and eye damage.
H335 - May cause respiratory irritation.

Precautionary statements (CLP): P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P240 - Ground/bond container and receiving equipment.
P260 - Do not breathe vapours.
P264 - Wash hands thoroughly after handling.
P310 - Immediately call a POISON CENTER or doctor/physician.

2.3. Other hazards
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.

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>Classification according to Regulation (EC) No. 1272/2008 [CLP]</th>
</tr>
</thead>
</table>
| Titanium tetrakis(diethylamide) | (CAS-No.) 4419-47-0 (EC-No.) 437-500-7 | 99 - 100 | Flam. Liq. 3, H226  
Skin Corr. 1B, H314  
Eye Dam. 1, H318  
STOT SE 3, H335 |

Full text of 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 person to fresh air and keep comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact: Wash with plenty of 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, both 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. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures
5.1. Extinguishing media
Unsuitable extinguishing media: Do not use straight streams.

5.2. Special hazards arising from the substance or mixture
Fire hazard: Flammable liquid and vapour. 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 vapour-air mixture.

5.3. Advice for firefighters
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 vapour 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.

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 vapours are flammable. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Precautions for safe handling: Avoid all eye and skin contact and do not breathe vapour and mist. Ground/bond container and receiving equipment. Provide good ventilation in process area to prevent formation of vapour. 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.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

Appropriate engineering controls:

Provide local exhaust or general room ventilation.

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Liquid.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>336.4 g/mol</td>
</tr>
<tr>
<td>Colour</td>
<td>Orange-amber.</td>
</tr>
<tr>
<td>Odour</td>
<td>Acrid. Amine.</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Refractive index</td>
<td>1.536</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butylacetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>&lt; 0 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>133 °C @ 1.2 mm Hg</td>
</tr>
<tr>
<td>Flash point</td>
<td>37 °C</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Flammable liquid and vapour.</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>0.035 mm Hg @ 40 °C</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>&gt; 1</td>
</tr>
<tr>
<td>Relative density</td>
<td>0.938</td>
</tr>
<tr>
<td>Solubility</td>
<td>Reacts with water</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

#### 9.2. Other information

No additional information 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

Acids. alcohols. Oxidizing agent.

#### 10.6. Hazardous decomposition products

Diethylamine. Organic acid vapors.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Causes severe skin burns and eye damage.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious eye damage/irritation</td>
<td>Causes serious eye damage.</td>
</tr>
<tr>
<td>Respiratory or skin sensitisation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>STOT-single exposure</td>
<td>May cause respiratory irritation.</td>
</tr>
<tr>
<td>STOT-repeated exposure</td>
<td>Not classified</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Not classified</td>
</tr>
<tr>
<td>Symptoms/effects after inhalation</td>
<td>May cause respiratory irritation.</td>
</tr>
<tr>
<td>Symptoms/effects after skin contact</td>
<td>Causes (severe) skin burns.</td>
</tr>
<tr>
<td>Symptoms/effects after eye contact</td>
<td>Causes serious eye damage.</td>
</tr>
<tr>
<td>Symptoms/effects after ingestion</td>
<td>May be harmful if swallowed.</td>
</tr>
<tr>
<td>Reason for classification</td>
<td>Expert judgment</td>
</tr>
</tbody>
</table>

SECTION 12: Ecological information

12.1. Toxicity
Acute aquatic toxicity: Not classified
Chronic aquatic toxicity: Not classified

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. Results of PBT and vPvB assessment
No additional information available

12.6. Other adverse effects
Other adverse effects: This substance may be hazardous to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment 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 vapours are flammable.
Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number
In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number
UN-No. (ADR): 2920
UN-No. (IMDG): 2920
UN-No. (IATA): 2920
UN-No. (ADN): 2920
UN-No. (RID): 2920

14.2. UN proper shipping name
Proper Shipping Name (ADR): CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Proper Shipping Name (IMDG): CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Proper Shipping Name (IATA): Corrosive liquid, flammable, n.o.s.
Proper Shipping Name (ADN): CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Proper Shipping Name (RID): CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Transport document description (ADR): UN 2920 CORROSIVE LIQUID, FLAMMABLE, N.O.S. (TITANIUM TETRAKIS(DIETHYLAMIDE)), 8 (3), II, (D/E)
14.3. Transport hazard class(es)

ADR
Transport hazard class(es) (ADR) : 8 (3)
Danger labels (ADR) : 8, 3

IMDG
Transport hazard class(es) (IMDG) : 8 (3)
Danger labels (IMDG) : 8, 3

IATA
Transport hazard class(es) (IATA) : 8 (3)
Hazard labels (IATA) : 8, 3

ADN
Transport hazard class(es) (ADN) : 8 (3)
Danger labels (ADN) : 8, 3

RID
Transport hazard class(es) (RID) : 8 (3)
Danger labels (RID) : 8, 3

14.4. Packing group

Packing group (ADR) : II
Packing group (IMDG) : II
Packing group (IATA) : II
TITANIUM TETRAKIS(DIETHYLAMIDE), 99+%  
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14.5. Environmental hazards
Dangerous for the environment: No
Marine pollutant: No
Other information: No supplementary information available

14.6. Special precautions for user

- Overland transport
  Classification code (ADR): CF1
  Special provisions (ADR): 274
  Limited quantities (ADR): 1l
  Excepted quantities (ADR): E2
  Packing instructions (ADR): P001, IBC02
  Mixed packing provisions (ADR): MP15
  Portable tank and bulk container instructions (ADR): T11
  Portable tank and bulk container special provisions (ADR): TP2, TP27
  Tank code (ADR): L4BN
  Vehicle for tank carriage: FL
  Transport category (ADR): 2
  Special provisions for carriage - Operation (ADR): S2
  Hazard identification number (Kemler No.): 83
  Orange plates: 83
  Tunnel restriction code (ADR): D/E

- Transport by sea
  Special provisions (IMDG): 274
  Limited quantities (IMDG): 1 L
  Excepted quantities (IMDG): E2
  IBC packing instructions (IMDG): IBC02
  Packing instructions (IMDG): P001
  Tank instructions (IMDG): T11
  Tank special provisions (IMDG): TP2, TP27
  EmS-No. (Fire): F-E
  EmS-No. (Spillage): S-C
  Stowage category (IMDG): C
  Stowage and handling (IMDG): SW1, SW2
  Properties and observations (IMDG): Causes burns to skin, eyes and mucous membranes.

- Air transport
  PCA Excepted quantities (IATA): E2
  PCA Limited quantities (IATA): Y840
  PCA limited quantity max net quantity (IATA): 0.5L
  PCA packing instructions (IATA): 851
  PCA max net quantity (IATA): 1L
  CAO packing instructions (IATA): 855
  CAO max net quantity (IATA): 30L
  ERG code (IATA): 8F

- Inland waterway transport
  Classification code (ADN): CF1
  Special provisions (ADN): 274
  Limited quantities (ADN): 1 L
TITANIUM TETRAKIS(DIETHYLAMIDE), 99+%  
Safety Data Sheet

<table>
<thead>
<tr>
<th>Excepted quantities (ADN)</th>
<th>E2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carriage permitted (ADN)</td>
<td>T</td>
</tr>
<tr>
<td>Equipment required (ADN)</td>
<td>PP, EP, EX, A</td>
</tr>
<tr>
<td>Ventilation (ADN)</td>
<td>VE01</td>
</tr>
<tr>
<td>Number of blue cones/lights (ADN)</td>
<td>1</td>
</tr>
</tbody>
</table>

- Rail transport
  | Classification code (RID) | CF1 |
  | Special provisions (RID)  | 274 |
  | Limited quantities (RID)  | 1L  |
  | Excepted quantities (RID) | E2  |
  | Packing instructions (RID) | P001, IBC02 |
  | Portable tank and bulk container instructions (RID) | T11 |
  | Portable tank and bulk container special provisions (RID) | TP2, TP27 |
  | Tank codes for RID tanks (RID) | L4BN |
  | Transport category (RID)  | 2   |
  | Colis express (express parcels) (RID) | CE6 |
  | Hazard identification number (RID) | 83 |

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code
Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations
No REACH Annex XVII restrictions
TITANIUM TETRAKIS(DIETHYLAMIDE), 99+% is not on the REACH Candidate List
TITANIUM TETRAKIS(DIETHYLAMIDE), 99+% is not on the REACH Annex XIV List
TITANIUM TETRAKIS(DIETHYLAMIDE), 99+% is not subject to REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals.

15.1.2. National regulations

Germany

Netherlands
SZW-lijst van kankerverwekkende stoffen: The substance is not listed
SZW-lijst van mutagene stoffen: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling: The substance is not listed

Denmark
Class for fire hazard: Class II-1
Store unit: 5 liter
Classification remarks: R10 <H226;H314;H335>: Emergency management guidelines for the storage of flammable liquids must be followed
Danish National Regulations: Young people below the age of 18 years are not allowed to use the product

15.2. Chemical safety assessment
No additional information available
SECTION 16: Other information

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

Other information:

Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

Eye Dam. 1  Serious eye damage/eye irritation, Category 1
Flam. Liq. 3  Flammable liquids, Category 3
Skin Corr. 1B  Skin corrosion/irritation, Category 1B
STOT SE 3  Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
H226  Flammable liquid and vapour.
H314  Causes severe skin burns and eye damage.
H318  Causes serious eye damage.
H335  May cause respiratory irritation.

SDS EU (REACH Annex II) - Custom

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