# Section 1: Identification of the substance/mixture and of the company/undertaking

## 1.1. Product identifier

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product form</td>
<td>Substance</td>
</tr>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Substance name</td>
<td>BIS(CYCLOPENTADIENYL)TITANIUM(III) CHLORIDE</td>
</tr>
<tr>
<td>Product code</td>
<td>OMTI010</td>
</tr>
<tr>
<td>Formula</td>
<td>C10H10ClTi</td>
</tr>
<tr>
<td>Synonyms</td>
<td>NUGENT’S REAGENT</td>
</tr>
<tr>
<td></td>
<td>TITANOCENE CHLORIDE</td>
</tr>
<tr>
<td></td>
<td>TITANOCENE MONOCHLORIDE</td>
</tr>
<tr>
<td></td>
<td>CHLORODICYCLOPENTADIENYTITANIUM</td>
</tr>
<tr>
<td>Chemical family</td>
<td>METAL COMPOUND</td>
</tr>
</tbody>
</table>

## 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]**

- Skin corrosion/irritation, Category 2: H315
- Serious eye damage/eye irritation, Category 2: H319

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): ![](gh807.png)

- Signal word (CLP): Warning

- Hazard statements (CLP): H315 - Causes skin irritation.
BIS(CYCLOPENTADIENYL)TITANIUM(III) CHLORIDE
Safety Data Sheet

Precautionary statements (CLP)

: P280 - Wear protective gloves/protective clothing/eye protection/face protection.
: P264 - Wash hands thoroughly after handling.
: P302+P352 - IF SKIN: Wash with plenty of soap and water.
: P332+P313 - IF skin irritation occurs: Get medical advice/attention.
: P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
: P337+P313 - If eye irritation persists: Get medical advice/attention.

2.3. Other hazards
No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Substance type</th>
<th>Mono-constituent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>BIS(CYCLOPENTADIENYL)TITANIUM(III) CHLORIDE</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>60955-54-6</td>
</tr>
</tbody>
</table>

<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>
<tbody>
<tr>
<td>Bis(cyclopentadienyl)titanium(III) chloride</td>
<td>(CAS-No.) 60955-54-6</td>
<td>95 - 100</td>
<td>Skin Irrit. 2, H315 Eye Irrit. 2, H319</td>
</tr>
</tbody>
</table>

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 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 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 irritation to the respiratory tract.

Symptoms/effects after skin contact : Causes skin irritation.

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

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 : None known.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.

5.3. Advice for firefighters

Firefighting instructions : Exercise caution when fighting any chemical fire. Use water spray or fog for cooling exposed containers.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Avoid contact with skin and eyes. Do not breathe dust.
SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

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 product 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: Sweep or shovel spills into appropriate container for disposal.

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

Precautions for safe handling: Avoid contact with skin and eyes. Do not breathe dust. Avoid dust formation. Provide local exhaust or general room ventilation to minimize exposure to dust. Should be handled under argon, preferably in a glove-box.
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

Storage conditions: Keep container tightly closed. Do not expose to light.
Incompatible materials: Oxidizing agent.
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. 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 dust and mist (teal cartridge) respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state: Solid
**Appearance:** Solid.

**Molecular mass:** 213.55 g/mol

**Colour:** Green.

**Odour:** No data available

**Odour threshold:** No data available

**Refractive index:** No additional information available

**pH:** No data available

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

**Melting point:** > 250 °C

**Freezing point:** No data available

**Boiling point:** No data available

**Flash point:** > 110 °C

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

**Decomposition temperature:** No data available

**Flammability (solid, gas):** No data available

**Vapour pressure:** < 0.01 mm Hg

**Relative vapour density at 20 °C:** No data available

**Relative density:** > 1

**% Volatiles:** < 3 %

**Solubility:** Insoluble in water. Reacts with water.

**Organic solvent:** Soluble: THF

**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

**Oxidising properties:** No data available

**Explosive limits:** No data available

**9.2. Other information:**

No additional information available

**SECTION 10: Stability and reactivity**

10.1. **Reactivity**

No additional information available

10.2. **Chemical stability**

Extremely sensitive to air. Should be handled under argon, preferably in a glove-box.

10.3. **Possibility of hazardous reactions**

No additional information available

10.4. **Conditions to avoid**

Avoid high concentrations of dust.

10.5. **Incompatible materials**

Oxidizing agent.

10.6. **Hazardous decomposition products**

Organic acid vapors. Titanium oxide.

**SECTION 11: Toxicological information**

11.1. **Information on toxicological effects**

**Acute toxicity:** Not classified

**BIS(CYCLOPENTADIENYL)TITANIUM(III) CHLORIDE (60955-54-6)**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 intraperitoneal rat</td>
<td>25 mg/kg related compound- TITANOCENE DICHLORIDE</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Causes serious eye irritation.</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>
</tbody>
</table>
BIS(CYCLOPENTADIENYLNITRIL)TITANIUM(III) CHLORIDE
Safety Data Sheet

Carcinogenicity: Not classified
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
STOT-single exposure: Not classified
STOT-repeated exposure: Not classified
Aspiration hazard: Not classified
Potential adverse human health effects and symptoms: The following data is for the related compound- TITANOCENE DICHLORIDE. Chronic Toxicity: Tumorogenic by RTECS criteria EPA GENETOX PROGRAM 1988, POSITIVE SHE-CLONAL ASSAY; CELL TRANSFORM. RLV F344 RAT EMBRYO EPA GENETOX PROGRAM 1988, NEGATIVE: HOST-MEDIATED ASSAY; S CEREVISIAE-HOMOZYGOS.

Symptoms/effects after inhalation: May cause irritation to the respiratory tract.
Symptoms/effects after skin contact: Causes skin irritation.
Symptoms/effects after eye contact: Causes serious eye irritation.
Symptoms/effects after ingestion: May be harmful if swallowed.
Reason for classification: Expert judgment

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: Incinerate. Dispose in a safe manner in accordance with local/national regulations. Dispose of solid materials or residues at a licensed site.
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): Not applicable
UN-No. (IMDG): Not applicable
UN-No. (IATA): Not applicable
UN-No. (ADN): Not applicable
UN-No. (RID): Not applicable

14.2. UN proper shipping name
Proper Shipping Name (ADR): Not applicable
Proper Shipping Name (IMDG): Not applicable
Proper Shipping Name (IATA): Not applicable
Proper Shipping Name (ADN): Not applicable
Proper Shipping Name (RID): Not applicable
14.3. Transport hazard class(es)

<table>
<thead>
<tr>
<th>ADR</th>
<th>Transport hazard class(es) (ADR)</th>
<th>Not applicable</th>
</tr>
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<tbody>
<tr>
<td>IMDG</td>
<td>Transport hazard class(es) (IMDG)</td>
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</tr>
<tr>
<td>IATA</td>
<td>Transport hazard class(es) (IATA)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>ADN</td>
<td>Transport hazard class(es) (ADN)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>RID</td>
<td>Transport hazard class(es) (RID)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

14.4. Packing group

<table>
<thead>
<tr>
<th>Packing group (ADR)</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing group (IMDG)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Packing group (IATA)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Packing group (ADN)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Packing group (RID)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

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
  Not applicable
- Transport by sea
  Not applicable
- Air transport
  Not applicable
- Inland waterway transport
  Not applicable
- Rail transport
  Not applicable

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
BIS(CYCLOPENTADIENYL)TITANIUM(III) CHLORIDE is not on the REACH Candidate List
BIS(CYCLOPENTADIENYL)TITANIUM(III) CHLORIDE is not on the REACH Annex XIV List
BIS(CYCLOPENTADIENYL)TITANIUM(III) CHLORIDE 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.

% Volatiles | < 3 %

15.1.2. National regulations
**BIS(CYCLOPENTADIENYL)TITANIUM(III) CHLORIDE**

**Safety Data Sheet**

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### Germany

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV: Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

### Netherlands

- **SZW-list van kankerverwekkende stoffen**: The substance is not listed
- **SZW-list 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

### 15.2. Chemical safety assessment

No additional information available

### SECTION 16: Other information

**Abbreviations and acronyms:**

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

**Other information**: Prepared by safety and environmental affairs.

**Full text of H- and EUH-statements**:

| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |

---

**SDS EU (REACH Annex II) - Custom**

The information contained in this document has been gathered from reference materials and/or Gelest, Inc. test data and is to the best knowledge and belief of Gelest, Inc. accurate and reliable. Such information is offered solely for your consideration, investigation and verification. It is not suggested or guaranteed that the hazard precautions or procedures described are the only ones which exist. Gelest, Inc. makes no warranties, express or implied, with respect to the use of such information and assumes no responsibility therefore. Information on this safety data sheet is not intended to constitute a basis for product specifications.

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