SAFETY DATA SHEET
Titanium Nitride (powder and pieces)

1. Identification

Product identifier

Product name Titanium Nitride (powder and pieces)
Internal identification Replaces M-2100-305, M-2100-306
CAS number 25583-20-4

Recommended use of the chemical and restrictions on use

Application Exterior surface coating.
Uses advised against No specific uses advised against are identified.

Details of the supplier of the safety data sheet

Supplier Kurt J Lesker Company
Manufacturer Kurt J Lesker Company
1925 Route 51
Jefferson Hills, PA 15025
+1 412-387-9200

Kurt J Lesker Company LTD
United Kingdom
15-16 Burgess Road
Hastings, East Sussex, TN35 4NR
England
Customer Service: +44 (0) 1424 458100
msds@lesker.com

Emergency telephone number

Emergency telephone North America [USA, Canada, Mexico]: 1-866-519-4752
Mainland China: (+86) 4001 2001 74
Europe: (int'l call prefix)-1-760-476-3961
Asia Pacific: (int'l call prefix)-1-760-476-3960
Middle East & Africa: (int'l call prefix)-1-760-476-3959

2. Hazard(s) identification

Classification of the substance or mixture

Physical hazards Not Classified
Health hazards Not Classified
Environmental hazards Not Classified

Label elements

Hazard statements NC Not Classified

Other hazards
Titanium Nitride (powder and pieces)

This substance is not classified as PBT or vPvB according to current EU criteria. Based on available knowledge of this material, it has been determined to be non-hazardous and will not pose a risk to persons or the environment in its provided form. However, any cutting, welding, melting, grinding, or use for deposition will produce dust, fume, or particulates containing component elements of this material. Exposure to these components may present significant health hazards. Note: Fine particulate may be a combustible dust which, when dispersed in air, may present an explosion hazard.

3. Composition/Information on ingredients

| Mixtures |
|---------------------------------|--------|
| Titanium Nitride (pieces)       | 0 - 100% |
| CAS number: 25583-20-4          |

Classification
Not Classified

The Full Text for all Hazard Statements are Displayed in Section 16.

4. First-aid measures

<table>
<thead>
<tr>
<th>Description of first aid measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>General information</td>
</tr>
<tr>
<td>Inhalation</td>
</tr>
<tr>
<td>Ingestion</td>
</tr>
<tr>
<td>Skin Contact</td>
</tr>
<tr>
<td>Eye contact</td>
</tr>
<tr>
<td>Protection of first aiders</td>
</tr>
</tbody>
</table>

Most important symptoms and effects, both acute and delayed

| General information               | The severity of the symptoms described will vary dependent on the concentration and the length of exposure. |
| Inhalation                        | No specific symptoms known. |
| Ingestion                         | No specific symptoms known. May cause discomfort if swallowed. |
| Skin contact                      | Prolonged contact may cause dryness of the skin. |
| Eye contact                       | No specific symptoms known. May be slightly irritating to eyes. |

Indication of immediate medical attention and special treatment needed

| Notes for the doctor              | Treat symptomatically. |
| Specific treatments               | No special treatment required. |

5. Fire-fighting measures

<table>
<thead>
<tr>
<th>Extinguishing media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitable extinguishing media</td>
</tr>
</tbody>
</table>
Titanium Nitride (powder and pieces)

Unsuitable extinguishing media
Do not use water jet as an extinguisher, as this will spread the fire.

Special hazards arising from the substance or mixture
Specific hazards
None known.

Hazardous combustion products
Thermal decomposition or combustion products may include the following substances:
Harmful gases or vapors.

Advice for firefighters
Protective actions during firefighting
Avoid breathing fire gases or vapors. Evacuate area. Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for firefighters
Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing. Standard Firefighter's clothing including helmets, protective boots and gloves will provide a basic level of protection for chemical incidents.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Personal precautions
No specific recommendations. For personal protection, see Section 8.

Environmental precautions
Environmental precautions
Avoid discharge into drains or watercourses or onto the ground.

Methods and material for containment and cleaning up
Methods for cleaning up
Reuse or recycle products wherever possible. Collect spillage with a shovel and broom, or similar and reuse, if possible. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water. Wash thoroughly after dealing with a spillage. Dispose of contents/container in accordance with national regulations.

Reference to other sections
For personal protection, see Section 8.

7. Handling and storage

Precautions for safe handling
Usage precautions
Read and follow manufacturer's recommendations. Wear protective clothing as described in Section 8 of this safety data sheet. Keep away from food, drink and animal feeding stuffs. Keep container tightly sealed when not in use.

Advice on general occupational hygiene
Wash promptly if skin becomes contaminated. Take off contaminated clothing and wash before reuse. Wash contaminated clothing before reuse.

Conditions for safe storage, including any Incompatibilities
Storage precautions
No specific recommendations.

Storage class
Unspecified storage.

Specific end uses(s)
The identified uses for this product are detailed in Section 1.2.

8. Exposure Controls/personal protection

Exposure controls
Appropriate engineering controls
No specific ventilation requirements.
Titanium Nitride (powder and pieces)

Eye/face protection  No specific eye protection required during normal use. Large Spillages: Eyewear complying with an approved standard should be worn if a risk assessment indicates eye contact is possible.

Hand protection  No specific hand protection recommended. Large Spillages: Wear protective gloves.

Hygiene measures  Wash hands thoroughly after handling. Wash at the end of each work shift and before eating, smoking and using the toilet. Do not eat, drink or smoke when using this product.

Respiratory protection  No specific recommendations. Provide adequate ventilation. Large Spillages: If ventilation is inadequate, suitable respiratory protection must be worn.

Environmental exposure controls  Not regarded as dangerous for the environment.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Solid.</td>
</tr>
<tr>
<td>Color</td>
<td>Yellowish.</td>
</tr>
<tr>
<td>Odor</td>
<td>No characteristic odor.</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Melting point</td>
<td>2930°C</td>
</tr>
<tr>
<td>Initial boiling point and range</td>
<td>Not available.</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not available.</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not available.</td>
</tr>
<tr>
<td>Relative density</td>
<td>5.22 @ 25°C</td>
</tr>
<tr>
<td>Bulk density</td>
<td>Not available.</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td>Insoluble in water.</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>Not available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>61.874</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

Reactivity  There are no known reactivity hazards associated with this product.
Titanium Nitride (powder and pieces)

Stability
Stable at normal ambient temperatures and when used as recommended. Stable under the prescribed storage conditions.

Possibility of hazardous reactions
No potentially hazardous reactions known.

Conditions to avoid
There are no known conditions that are likely to result in a hazardous situation.

Materials to avoid
No specific material or group of materials is likely to react with the product to produce a hazardous situation.

Hazardous decomposition products
Does not decompose when used and stored as recommended. Thermal decomposition or combustion products may include the following substances: Harmful gases or vapors.

11. Toxicological information

Information on toxicological effects

Toxicological effects
Not regarded as a health hazard under current legislation.

Acute toxicity - oral
Notes (oral LD₅₀)
Based on available data the classification criteria are not met.

Acute toxicity - dermal
Notes (dermal LD₅₀)
Based on available data the classification criteria are not met.

Acute toxicity - inhalation
Notes (inhalation LC₅₀)
Based on available data the classification criteria are not met.

Skin corrosion/irritation

Animal data
Based on available data the classification criteria are not met.

Serious eye damage/irritation
Based on available data the classification criteria are not met.

Respiratory sensitization
Based on available data the classification criteria are not met.

Skin sensitization

Germ cell mutagenicity
Based on available data the classification criteria are not met.

Genotoxicity - in vitro
Based on available data the classification criteria are not met.

Carcinogenicity
Based on available data the classification criteria are not met.

IARC carcinogenicity
None of the ingredients are listed or exempt.

Reproductive toxicity

Reproductive toxicity - fertility
Based on available data the classification criteria are not met.

Reproductive toxicity - development
Based on available data the classification criteria are not met.

Specific target organ toxicity - single exposure

STOT - single exposure
Not classified as a specific target organ toxicant after a single exposure.

Specific target organ toxicity - repeated exposure
Titanium Nitride (powder and pieces)

<table>
<thead>
<tr>
<th>STOT - repeated exposure</th>
<th>Not classified as a specific target organ toxicant after repeated exposure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspiration hazard</td>
<td>Not relevant. Solid.</td>
</tr>
</tbody>
</table>

**General information**

- No specific health hazards known. The severity of the symptoms described will vary dependent on the concentration and the length of exposure.
- Inhalation
  - No specific symptoms known.
- Ingestion
  - No specific symptoms known. May cause discomfort if swallowed.
- Skin Contact
  - Prolonged contact may cause dryness of the skin.
- Eye contact
  - No specific symptoms known. May be slightly irritating to eyes.
- Route of entry
  - Ingestion Inhalation Skin and/or eye contact
- Target Organs
  - No specific target organs known.

### 12. Ecological Information

<table>
<thead>
<tr>
<th>Ecotoxicity</th>
<th>Not regarded as dangerous for the environment. However, large or frequent spills may have hazardous effects on the environment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity</td>
<td>Based on available data the classification criteria are not met.</td>
</tr>
<tr>
<td>Persistence and degradability</td>
<td>The degradability of the product is not known.</td>
</tr>
<tr>
<td>Bio-Accumulative Potential</td>
<td>No data available on bioaccumulation.</td>
</tr>
<tr>
<td>Mobility in soil</td>
<td>No data available.</td>
</tr>
<tr>
<td>Mobility</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

### 13. Disposal considerations

<table>
<thead>
<tr>
<th>Waste treatment methods</th>
</tr>
</thead>
</table>

**General information**

- The generation of waste should be minimized or avoided wherever possible. Reuse or recycle products wherever possible. This material and its container must be disposed of in a safe way.

**Disposal methods**

- Dispose of surplus products and those that cannot be recycled via a licensed waste disposal contractor. Waste packaging should be collected for reuse or recycling. Incineration or landfill should only be considered when recycling is not feasible. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of the local water authority.

### 14. Transport information

**General**

- The product is not covered by international regulations on the transport of dangerous goods (IMDG, IATA, DoT).
Titanium Nitride (powder and pieces)

**UN Number**
Not applicable.

**UN proper shipping name**
Not applicable.

**Transport hazard class(es)**
No transport warning sign required.

**Packing group**
Not applicable.

**Environmental hazards**
Environmentally Hazardous Substance
No.

**Special precautions for user**
Not applicable.

**Transport in bulk according to**
Not applicable.
Annex II of MARPOL 73/78
and the IBC Code

### 15. Regulatory information

**US Federal Regulations**

**SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities**
None of the ingredients are listed or exempt.

**CERCLA/Superfund, Hazardous Substances/Reportable Quantities (EPA)**
None of the ingredients are listed or exempt.

**SARA Extremely Hazardous Substances EPCRA Reportable Quantities**
None of the ingredients are listed or exempt.

**SARA 313 Emission Reporting**
None of the ingredients are listed or exempt.

**CAA Accidental Release Prevention**
None of the ingredients are listed or exempt.

**FDA - Essential Chemical**
None of the ingredients are listed or exempt.

**FDA - Precursor Chemical**
None of the ingredients are listed or exempt.

**SARA (311/312) Hazard Categories**
None of the ingredients are listed or exempt.

**OSHA - Highly Hazardous Chemicals**
None of the ingredients are listed or exempt.

**US State Regulations**
Titanium Nitride (powder and pieces)

California Proposition 65 Carcinogens and Reproductive Toxins
None of the ingredients are listed or exempt.

California Air Toxics "Hot Spots" (A-I)
None of the ingredients are listed or exempt.

California Air Toxics "Hot Spots" (A-II)
None of the ingredients are listed or exempt.

California Directors List of Hazardous Substances
None of the ingredients are listed or exempt.

Massachusetts "Right To Know" List
None of the ingredients are listed or exempt.

Rhode Island "Right To Know" List
None of the ingredients are listed or exempt.

Minnesota "Right To Know" List
None of the ingredients are listed or exempt.

New Jersey "Right To Know" List
None of the ingredients are listed or exempt.

Pennsylvania "Right To Know" List
None of the ingredients are listed or exempt.

Inventories
US - TSCA
None of the ingredients are listed or exempt.

US - TSCA 12(b) Export Notification
None of the ingredients are listed or exempt.

Philippines - PICCS
All the ingredients are listed or exempt.

New Zealand - NZIOC
All the ingredients are listed or exempt.

16. Other information

<table>
<thead>
<tr>
<th>Training advice</th>
<th>Only trained personnel should use this material.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revision date</td>
<td>3/20/2017</td>
</tr>
<tr>
<td>Revision</td>
<td>4</td>
</tr>
<tr>
<td>Supersedes date</td>
<td>2/3/2017</td>
</tr>
<tr>
<td>SDS No.</td>
<td>4689</td>
</tr>
</tbody>
</table>

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