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

#### 1.1 Product identifier

<table>
<thead>
<tr>
<th>CAS Number:</th>
<th>13463-67-7</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC number:</td>
<td>236-675-5</td>
</tr>
<tr>
<td>Registration number</td>
<td>01-2119489379-17-xxxx</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Identified uses of the substance or mixture</th>
<th>Uses advised against</th>
</tr>
</thead>
<tbody>
<tr>
<td>White pigment for application in Coating materials, printing inks, man-made fibres, plastics, paper, glass, vitreous enamels, ceramic products Manufacture of titanium metal</td>
<td>None</td>
</tr>
</tbody>
</table>

#### 1.3 Details of the supplier of the safety data sheet

**Manufacturer/Supplier:** KRONOS INTERNATIONAL, Inc.
Peschstraße 5
51373 Leverkusen, Germany
Tel.: INT +49 214 356-0

#### 1.4 EMERGENCY TELEPHONE NUMBER:

**KRONOS INTERNATIONAL, Inc. (Germany)**
Tel.: INT + 49 214 356-4444

### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008: The substance is not classified according to the CLP regulation.

#### 2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008:

- Hazard pictograms: not applicable
- Signal word: not applicable
- Hazard statements: not applicable

#### 2.3 Other hazards

Dust load

### SECTION 3: Composition/information on ingredients

#### 3.1 Chemical characterization: Substances

<table>
<thead>
<tr>
<th>CAS No. Designation:</th>
<th>13463-67-7 titanium dioxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC number:</td>
<td>236-675-5</td>
</tr>
<tr>
<td>Additional information:</td>
<td>Standard EN ISO 591-1</td>
</tr>
</tbody>
</table>

### SECTION 4: First aid measures

#### 4.1 Description of first aid measures

**General information:** No special measures required.

(Contd. on page 2)
Trade name: KRONOS Titanium dioxide (all types)

46.0.4

After inhalation: Supply fresh air; consult doctor in case of symptoms.

After skin contact: Wash with water and soap and rinse thoroughly.

After eye contact: Rinse opened eye for several minutes under running water. In case of persistent symptoms consult physician.

After swallowing: No special measures required.

4.2 Most important symptoms and effects, both acute and delayed

No further relevant information available.

4.3 Indication of any immediate medical attention and special treatment needed

No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents: Use fire fighting measures that suit the environment. The product is not inflammable.

5.2 Special hazards arising from the substance or mixture

None

5.3 Advice for firefighters

Protective equipment: Use protective measures that suit the hazard conditions.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Not required.

6.2 Environmental precautions: No special measures required.

6.3 Methods and material for containment and cleaning up: Collect mechanically.

6.4 Reference to other sections

See Section 8 for information on personal protection equipment. See Section 13 for information on disposal.

SECTION 7: Handling and storage

Handling:

7.1 Precautions for safe handling

Provide vacuum dust collection if dust is formed.

(Contd. of page 1)
### Trade name: KRONOS Titanium dioxide (all types)

<table>
<thead>
<tr>
<th>Information about protection against explosions and fires:</th>
<th>The product is not inflammable.</th>
</tr>
</thead>
</table>

**7.2 Conditions for safe storage, including any incompatibilities**

**Requirements to be met by storerooms and containers:** No special requirements.

**Information about storage in one common storage facility:** Not required.

**Further information about storage conditions:** Store under dry conditions.

**7.3 Specific end use(s)** There are no further specific end uses than those named in section 1.2.

---

#### SECTION 8: Exposure controls/personal protection

**8.1 Control parameters**

**Components with critical values that require monitoring at the workplace:**

- **CAS: 13463-67-7 titanium dioxide**
  - WEL Long-term value: $10* 4**$ mg/m³
  - *total inhalable **respirable

**DNELs**

**Worker**

- **CAS: 13463-67-7 titanium dioxide**
  - Inhalative (Worker): 10 mg/m³ (Local long-term effects)

**Professional user**

- **CAS: 13463-67-7 titanium dioxide**
  - Inhalative (Professional user): 10 mg/m³ (Local long-term effects)

**Consumer**

- **CAS: 13463-67-7 titanium dioxide**
  - Oral (Consumer): 700 mg/kg/d (Systemic long-term effects)

**PNECs**

**Water**

- **CAS: 13463-67-7 titanium dioxide**
  - PNEC 0.0184 mg/l (marine waters)
    - 0.184 mg/l (freshwater)
    - 0.193 mg/l (intermittent release)

**Sewage treatment plants (STP)**

- **CAS: 13463-67-7 titanium dioxide**
  - PNEC 100 mg/l (STP)

**Sediment**

- **CAS: 13463-67-7 titanium dioxide**
  - PNEC 100 mg/kg dw (Sediment (marine waters))
    - 1,000 mg/kg dw (Sediment (freshwater))

(Contd. on page 4)
Trade name: KRONOS Titanium dioxide (all types)

8.2 Exposure controls

Personal protective equipment:

General protective and hygienic measures:
The usual precautionary measures should be adhered to in handling the chemicals. Titanium dioxide pigments are not irritant but as with all fine powders can absorb moisture and natural oil from the surface of the skin during prolonged exposure. Prolonged exposure should be avoided by wearing suitable protective gloves and clothing.

Breathing equipment:
If workplace exposure limits are exceeded, use respiration protection according to national regulations.
EN149: FFP2; EN143: P2

Protection of hands:
Requirements according to EN 420
Check protective gloves prior to each use for their proper condition.
Preventive skin protection by use of skin-protecting agents is recommended.

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. If the product is used in a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.

Eye protection:
Safety glasses

Body protection:
Protective work clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information

Appearance:
Form: Powder
Colour: White
Smell: Odourless
Odour threshold: Not relevant

pH-value (100 g/l) at 20°C: 7

Melting point/freezing point: >1800°C

Initial boiling point and boiling range: Not relevant

Flash point: Not applicable

Flammability (solid, gas): Product is not inflammable.
Trade name: KRONOS Titanium dioxide (all types)

Ignition temperature: Not applicable
Explosive properties: Product is not explosive.
Density: 20°C
- Anatase 3.9 g/cm³
- Rutile 4.2 g/cm³
Apparent density at 20°C: 500-900 kg/m³
Vapour density: Not applicable.
Evaporation rate: Not applicable.
Solubility in / Miscibility with Water: Insoluble
Partition coefficient: n-octanol/water: Not applicable
Viscosity: dynamic: Not applicable.

9.2 Other information
No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity
The substance is stable under normal use conditions.

10.2 Chemical stability
Thermal decomposition / Conditions to be avoided: No decomposition under normal use conditions.

10.3 Possibility of hazardous reactions
No dangerous reactions known

10.4 Conditions to avoid
No further data; see section 7.

10.5 Incompatible materials:
No further data; see section 7.

10.6 Hazardous decomposition products:
No dangerous decomposition products known

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity
Based on available data, the classification criteria are not met. 
LD/LC50 values that are relevant for classification:
CAS: 13463-67-7 titanium dioxide
- Oral LD₅₀ > 5,000 mg/kg (rat) (OECD 425)
- Dermal LD₅₀ > 5,000 mg/kg (rabbit)
Trade name: KRONOS Titanium dioxide (all types)

Inhalative LC50/4h > 6.8 mg/l (rat)

Primary irritant effect:
Skin corrosion/irritation
OECD 404:
No irritant effect

Serious eye damage/irritation
OECD 405:
No irritant effect
Like any foreign body, particles (dust) can cause mechanical irritation.

Respiratory or skin sensitisation
OECD 406, OECD 429
No sensitizing effects.

Subacute to chronic toxicity:
CAS: 13463-67-7 titanium dioxide
Oral NOAEL 3,500 mg/kg/d (rat) (90 d)
Dermal NOAEL (-)
no relevant data available
Inhalative NOAEC 10 mg/m³ (rat) (90 d)

Toxicokinetics, metabolism and distribution
No substantial accumulation of titanium was observed in tissues following oral administration of titanium dioxide.
Dermal absorption can be considered negligible, as titanium dioxide has been shown not to penetrate human skin to any appreciable degree.

CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)
Germ cell mutagenicity Based on available data, the classification criteria are not met.
Carcinogenicity Based on available data, the classification criteria are not met.
Reproductive toxicity Based on available data, the classification criteria are not met.
STOT-single exposure Based on available data, the classification criteria are not met.
STOT-repeated exposure Based on available data, the classification criteria are not met.
Aspiration hazard Based on available data, the classification criteria are not met.

*SECTION 12: Ecological information*

12.1 Toxicity

Toxicity to fish
Titanium dioxide
Freshwater fish:
Pimephales promelas LC50 (96 h): > 1000 mg/l (static, EPA-540/9-85-006, Acute Toxicity Test for Freshwater Fish)
Marine water fish:
Cyprinodon variegatus LC50 (96 h): > 10000 mg/l (semi-static, OECD 203)

Toxicity to Daphnia and other aquatic invertebrates
Trade name: KRONOS Titanium dioxide (all types)

(Contd. of page 6)

46.0.4 Titanium dioxide

Freshwater:
Daphnia magna LC50 (48 h): > 1000 mg/l (static, equivalent or similar to OECD 202)
Marine water:
Acartia tonsa LC50 (48 h): > 10000 mg/l (ISO 14669 (1999); ISO 5667-16 (1998))

Toxicity to algae and aquatic plants

Titanium dioxide
Freshwater:
Pseudokirchnerella subcapitata EC50 (72 h): > 100 mg/l (static, OECD 201))
Marine water:
Skeletonema costatum EC50 (72 h): > 10000 mg/l (ISO 10253)

Toxicity to sediment organisms

Titanium dioxide
Freshwater:
Hyalella azteca NOEC(28 d): ≥ 100000 mg/kg sediment dw (semi-static, ASTM 1706)
Marine water:
Corophium volutator NOEC (10 d): ≥ 14989 mg/kg sediment dw (semi-static, OSPARCOM guidelines (1995))

12.2 Persistence and degradability
Not relevant for inorganic substances.

12.3 Bioaccumulative potential
Does not accumulate in organisms

12.4 Mobility in soil
The substance is immobile in soil.

12.5 Results of PBT and vPvB assessment
The product is an inorganic substance and does not fulfill the criteria for PBZ and vPvB according to Annex XIII of REACH.

12.6 Other adverse effects
No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
European waste catalogue
Waste code number according to origin of waste

Uncleaned packagings:
Recommendation:
Disposal according to official regulations
Packaging can be reused or recycled after cleaning.

SECTION 14: Transport information

14.1 UN-Number
ADR/RID/ADN, ADN, IMDG, IATA not applicable

14.2 UN proper shipping name
ADR/RID/ADN, ADN, IMDG, IATA not applicable

(Contd. on page 8)
14.3 Transport hazard class(es) (Contd. of page 7)

ADR/RID/ADN, ADN, IMDG, IATA
Class: not applicable

14.4 Packing group
ADR/RID/ADN, IMDG, IATA: not applicable

14.5 Environmental hazards
Not an environmentally hazardous substance.

14.6 Special precautions for user
Not applicable.

14.7 Transport in bulk according to Annex II of
MARPOL73/78 and the IBC Code
Not relevant.

SECTION 15: Regulatory information

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

National regulations:

Water hazard class: not hazardous for water

15.2 Chemical Safety Assessment

Substances of very high concern (SVHC) according to
REACH, Article 57
The product is not listed as SVHC, it does not contain any substances of very high concern.

Chemical safety assessment:
A Chemical Safety Assessment has been carried out.

SECTION 16: Other information

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Carcinogenicity: In February 2006 IARC concluded, "There is inadequate evidence in humans for the carcinogenicity of titanium dioxide." Based on rat inhalation studies IARC concluded that there is "sufficient evidence in experimental animals for the carcinogenicity of titanium dioxide," IARC's overall evaluation was that "Titanium dioxide is possibly carcinogenic to humans (Group 2b)."

This conclusion was based on IARC's guidelines which require such a classification if two or more independent studies in one species carried out at different times or in different laboratories or under different protocols show evidence of tumours.

Department issuing data specification sheet: Safety, Health & Environment

Contact:
Michaela Müller
Tel.: INT + 49 214 356-0
Fax: INT + 49 214 42150
e-mail: MSDS@kronosww.com

Abbreviations and acronyms:
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
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
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals

(Contd. on page 9)
<table>
<thead>
<tr>
<th>Trade name: KRONOS Titanium dioxide (all types)</th>
</tr>
</thead>
</table>

| EINECS: European Inventory of Existing Commercial Chemical Substances |
| CAS: Chemical Abstracts Service (division of the American Chemical Society) |
| LC50: Lethal concentration, 50 percent |
| LD50: Lethal dose, 50 percent |

**Sources**

- REACH-Registration Dossier (Update 2015)

* Data compared to the previous version altered. Amended according to Regulation (EU) no 2015/830