1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

- 1.1 Product identifier
  Product Code: SACHTLEBEN Rutile Series

- 1.2 Relevant identified uses of the substance or mixture and uses advised against
  Relevant identified uses:
  White pigment for paints and coatings, paper, rubber, plastics, printing inks
  Uses advised against: -

- 1.3 Details of the supplier of the safety data sheet
  Manufacturer / supplier: US Inquiry Office: Sachtleben LLC
  140 Grand Street, Suite 400
  White Plains NY 10601, USA
  Phone: +1-914-539-4080
  Fax: +1-914-539-6560
  Mail: Paul.Frazier@sachtleben.com

  Manufacturing Sites:
  ▶ Sachtleben Pigments Oy
  Titaanitie, 28840 Pori, Finland
  Phone: +358 10 430 1000

  ▶ Sachtleben Pigment GmbH
  47829 Krefeld, Germany
  Phone: +49 2151 4797-5230

  ▶ Sachtleben Chemie GmbH
  Dr.-Rudolf-Sachtleben-Str. 4
  D-47198 Duisburg, Germany
  Phone: +49 2066 22-0
  Fax: +49 2066 22-2000
  Mail: info@sachtleben.de
  Product Safety: product-safety@sachtleben.com

- 1.4 Emergency telephone number
  +49 30 30686 790 Giftnotruf Berlin (German/English)
  +1 800 255 3924 CHEMTEL (U S A)
  +358 9 471 977 or +358 9 4711 Poison Information Center
2. POSSIBLE HAZARDS

- 2.1 Classification of the substance or mixture
  May cause eye, skin and respiratory tract irritation. May be harmful if inhaled.
  OSHA regulatory status: This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

HMIS Ratings: Health 1 - Flammability: 0 - Reactivity: 0

Routes of exposure: Inhalation. Eye contact. Skin contact. Inhalation.

Eyes: Dust may cause: mechanical irritation.

Skin: TiO2 pigments are not irritant but as with all fine powders can adsorb moisture and natural oils from the surface of the skin during prolonged exposure.

Inhalation: May cause respiratory tract irritation.

Ingestion: May cause discomfort if swallowed. Target organs: Eyes. Skin. Respiratory system.

Chronic effects: Dusts or powder may irritate the respiratory tract, skin and eyes. Frequent inhalation of fume/dust over a long period of time may increase the risk of developing lung diseases although epidemiological studies among titanium dioxide workers could not demonstrate this.

Signs and symptoms: Upper respiratory tract irritation. Coughing. Irritation of eyes and mucous membranes. Skin irritation.

- 2.2. Label elements
  CANADA: Label has to state D2A and corresponding WHMIS symbol.

- 2.3 Other hazards

3. COMPOSITION/INFORMATION ON INGREDIENTS

- 3.1 Chemical Characterisation (Substance)

<table>
<thead>
<tr>
<th>Substance identification</th>
<th>CAS Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium Dioxide</td>
<td>13463-67-7</td>
<td>80-100</td>
</tr>
<tr>
<td>Aluminum oxide</td>
<td>1344-28-1</td>
<td>0 - 6</td>
</tr>
<tr>
<td>Silicon dioxide, amorphous</td>
<td>7631-86-9</td>
<td>0 - 10</td>
</tr>
<tr>
<td>Zirconium Dioxide</td>
<td>1314-23-4</td>
<td>0 - 1</td>
</tr>
</tbody>
</table>

Further information: Color Index C.I. 77891 Pigment white 6

- 3.2 Chemical Characterisation (Mixture)
  Description: No mixture
  Hazardous components: -

4. FIRST AID MEASURES

- 4.1 Description of first aid measures
General indications: In case of contact with eyes flush with plenty of water
Inhalation: Move to fresh air atmosphere. Give symptomatic treatment as necessary.
Skin contact: Wash with soap and water.
Eye contact: Wash with water or neutral eyewash solution.
Ingestion: Do not induce vomiting. Give up to 200 ml water. In case of persistant symptoms, consult a doctor.

4.2 Most important symptoms and effects, both acute and delayed

4.3 Indication of any immediate medical attention and special treatment needed

5. FIREFIGHTING MEASURES

5.1 Extinguishing media
No restrictions

5.2 Special hazards arising from the substance or mixture
The product itself does not burn. Product is inert, not flammable and incombustible.

5.3 Advice for firefighters
NFPA Ratings: Health 1 - Flammability: 0 - Reactivity: 0

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Ensure adequate ventilation.

6.2 Environmental precautions
Avoid dust dispersion to the environment. Dust may cause the surroundings to become white. Prevent leakages from entering drains and ditches that lead to natural waterways.

6.3 Methods and material for containment and cleaning up
Use any suitable mechanical means (e.g. vacuum, sweeping), but avoid dusting during clean-up.

6.4 Reference to other sections

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid dust formation during handling. Provide appropriate exhaust ventilation at machinery and at places where dust can be generated. In case of insufficient ventilation, wear suitable respiratory equipment.

7.2 Conditions for safe storage, including any incompatibilities
Fire Precautions: The product is not flammable
Storage conditions/packing material: Keep in a dry place.
Incompatible products: No restrictions

7.3 Specific end use(s)
8. EXPOSURE CONTROLS/PERSONAL PROTECTION

· 8.1 Control parameters

<table>
<thead>
<tr>
<th>Substance</th>
<th>Titanium dioxide 13463-67-7</th>
<th>Dust, inhalable</th>
<th>Dust, respirable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Limit value - Eight hours mg/m³</td>
<td>Limit value - Short term mg/m³</td>
<td>Limit value - Eight hours mg/m³</td>
</tr>
<tr>
<td>Austria</td>
<td>10</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Belgium</td>
<td>10</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Canada</td>
<td>10</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Québec</td>
<td>10</td>
<td>11 inhalable aerosol</td>
<td>10</td>
</tr>
<tr>
<td>Denmark</td>
<td>6 total dust</td>
<td>12 total dust</td>
<td>10</td>
</tr>
<tr>
<td>European Union</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Germany(AGS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany(DFG)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>10</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Italy</td>
<td>10</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Japan</td>
<td>10</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Poland</td>
<td>10</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Spain</td>
<td>10</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Sweden</td>
<td>5 inhalable aerosol</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Switzerland</td>
<td>3 respirable aerosol</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>The Netherlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA - OSHA</td>
<td>15 total dust</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10 inhalable aerosol</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4 respirable aerosol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
- Austria: *STV 15 minutes average value
- France: *Bold type: Restrictive statutory limit values
- Germany(AGS): *15 minutes average value, insoluble particulates
- Germany(DFG): *long term exposure level, insoluble particulates

(Source: GESTIS - Internationale Grenzwerte für chemische Substanzen - Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA))

· 8.2 Exposure controls

Engineering measures: None required

Personal Protection Equipment

Industrial hygiene measures: Maintain exposures below applicable exposure limits:
Respiratory protection: A respirator must be used if the dust concentration is likely to exceed the Occupational exposure limit. At higher concentrations wear particle filter DIN EN 143 - P2. or equivalent approved by NIOSH.
Hand protection: Prolonged exposure should be avoided by wearing suitable protective gloves and clothing.
Eye protection: The use of an approved dustproof goggles is recommended if the dust concentration is likely to exceed the Occupational exposure limit
Skin protection: TiO2 pigments are not irritant but as with all fine powders can adsorb moisture and natural oils from the surface of the skin during
prolonged exposure. Prolonged exposure should be avoided by wearing suitable protective gloves and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Physical State: powder</th>
<th>Colour: white</th>
<th>Odour: none</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Data</td>
<td>Melting point or range: &gt; 1,800°C</td>
<td>Boiling point or range: not applicable</td>
<td>Flash point: not flammable</td>
</tr>
<tr>
<td>Ignition temperature: not flammable</td>
<td>Auto-ignition temperature: not flammable</td>
<td>Oxidizing properties: none</td>
<td></td>
</tr>
<tr>
<td>Explosive properties: no danger of explosion.</td>
<td>Explo...</td>
<td>Density: approx. 4.1 g/ml</td>
<td></td>
</tr>
<tr>
<td>Vapour pressure: not applicable</td>
<td>Solubility: &lt; 0.01 g/l</td>
<td>pH-value: approx. 8</td>
<td></td>
</tr>
<tr>
<td>Partition coefficient: not applicable</td>
<td>Viscosity: not applicable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9.2 Other information

10. STABILITY AND REACTIVITY

10.1 Reactivity
No special reactivity known

10.2 Chemical stability
Stable under normal use conditions

10.3 Possibility of hazardous reactions
No hazardous reactions known

10.4 Conditions to avoid
Stable under normal use conditions

10.5 Incompatible materials
None known

10.6 Hazardous decomposition products
No hazardous decomposition products known

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Acute toxicity:
LD_{50} (rats, oral) > 10,000 mg/kg
Inhalative LC_{50} /4 hrs (Rat): > 6.8 mg/l

- **Irritation/corrosion:**
  Titanium dioxide is not irritating

- **Sensitisation:**
  No sensitisation known

- **Chronic Toxicity:**
  **Carcinogenicity:**
  Suspecting that long term inhalation of TiO2 dust may be a reason of causing cancer, IARC has classified TiO2 in 2006 as "possibly carcinogenic" to humans (Group 2B). Unless tumours produced in rats on inhalation of very high concentrations of titanium dioxide are believed to be the result of prolonged "lung overload" and probably not relevant to man..Two major epidemiology studies among titanium dioxide workers in the US and in EUROPE could not demonstrate an elevated lung cancer risk.

- **Further information:**

---

### 12. ECOLOGICAL INFORMATION

- **12.1 Toxicity**
  Aquatic toxicity: Fish LC_{50} (Leuciscus idus, 48h): > 1000 mg/l

- **12.2 Persistence and degradability**
  Methods for the determination of biodegradability are not applicable to inorganic substances.

- **12.3 Bioaccumulative potential**
  The product is practically insoluble in water and not biodegradable.

- **12.4 Mobility in soil**
  No data

- **12.5 Results of PBT and vPvB assessment**
  According to Annex XIII of regulation (EC) 1907/2006 a PBT and vPvB assessment shall not be conducted for inorganic substances. Titanium Dioxide is an inorganic substance, thus a PBT and vPvB assessment is not required.

- **12.6 Other adverse effects**

---

### 13. DISPOSAL CONSIDERATIONS

- **13.1 Waste treatment methods**
  **Product:** No hazardous waste according to European Directive 91/689/EEC and RCRA (Resource Conservations and Recovery Act - USA). Place in an appropriate disposal facility in compliance with local and national regulations.
  **Contaminated packaging:** Containers that cannot be cleaned must be treated as waste and disposed of in an approved industrial incineration facility. The empty and clean containers may be reused in conformity with regulations.
  **Cleanser:** water
14. TRANSPORT INFORMATION

· 14.1 UN number
The product is not classified as a hazardous material according to the DOT, ADR/RID, IMDG, IATA on the transport of dangerous or hazardous goods.

· 14.2 UN proper shipping name

· 14.3 Transport hazard class(es)

· 14.4 Packing group

· 14.5 Environmental hazards

· 14.6 Special precautions for user

· 14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

15. REGULATORY INFORMATION

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

· National Regulations
OSHA: This product is considered hazardous under the OSHA Hazard Communication Standard ((29 CFR 1910.1200).
SARA Title III Sec. 302/303 (Extremely Hazardous Substances): Not listed
SARA Title III Sec. 311/312 (40 CFR 370) Hazard Category: None
SARA Title III Sec. 313 (Toxic Chemicals Emissions Reporting): Not listed
CERCLA Hazardous Substance (40 CFR Part 302): Not listed
California Proposition 65: WARNING! This product contains a chemical known to the State of California to cause cancer: Titanium Dioxide (airborne, unbound particles of respirable size) The listing does not cover Titanium Dioxide when it remains bound within a product matrix.
Canada (WHMIS) This product has been classified as D2A controlled product under WHMIS. The listing does not cover titanium dioxide when it is inextricably bound within a product.
EINECS: (European Inventory of Existing Commercial Chemical Substances) 236-675-5
ELINCS: (European List of Notified Chemical Substances) not listed
TSCA: (Toxic Substances Control Act (EPA-Inventory) 13463-67-7
AICS: (Australian Inventory of Chemical Substances) 13463-67-7
DSL: (Canadian Domestic Substances List) 13463-67-7
NDDSL: (Canadian Non-Domestic Substances List) not listed
KECI: (Korean Existing Chemicals Inventory) KE-33900
PICCS: (Philippine Inventory of Chemicals and Chemical Substances) 522 5600
BAGT: (Giftliste des BA für Abfall und Gesundheitswesen der Schweiz) G 2950
METI: (Ministry of Economy, Trade an Industry - Japan) 1-558
SEPA: (State Environmental Protection Administration - China) 13463-67-7
15.2 Chemical safety assessment
The substance has undergone a safety assessment.

16. OTHER INFORMATION

- Changes against last version
  Integration of Sachtleben Pigment GmbH site products

- Hazard information which is referred to in section 2 or 3
  According to Regulation (EC) No 1272/2008:
  -
  According to Directive (EC) 67/548/EWG:
  -

(2011-TI-001-US)

The data given here are based on current knowledge and experience. The purpose of this Material Safety Data Sheet is to describe the product in terms of its safety requirements. The data do not signify any warranty with regard to the product's properties.