1. Product and company identification

**Product name**: Tronox® Titanium Dioxide, All Grades


**Product code**: 77891, Pigment White #6

**Company name**: Tronox LLC

**Address**: 3301 NW 150th Street

Oklahoma City, OK 73134

USA

**Email**: ChemProdSteward@tronox.com

**Telephone**: +1-405-775-5000 (24-hours)

**Emergency telephone number**: +1-877-358-7421

**Additional contact number**: +1-760-476-3962 (Access code: 333318)

**Recommended use**: White pigment for applications in coatings, inks, fibers, plastics, paper.

**MSDS No.**: B-5017

2. Hazards identification

**Hazard classification**: Not classified.

**Physical hazards**: Not classified.

**Health hazards**: Not classified.

**Environmental hazards**: Not classified.

**Label elements**: None.

**Symbols**: None.

**Signal word**: None.

**Hazard statement**: The product does not meet the criteria for classification.

**Precautionary statement**

**Prevention**: Observe good industrial hygiene practices.

**Response**: Flush skin thoroughly with water.

**Storage**: Store in a sealed container.

**Disposal**: Dispose of waste and residues in accordance with local authority requirements.

**Other hazards**: 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.

This product is classified as low-hazard (4th hazard class) in accordance with GOST 12.1.007.

3. Composition/information on ingredients

**Substance or mixture**: Mixture

<table>
<thead>
<tr>
<th>Chemical property</th>
<th>CAS Number</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>13463-67-7</td>
<td>80 - 97</td>
</tr>
<tr>
<td>Silicon dioxide</td>
<td>7631-86-9</td>
<td>0 - 15</td>
</tr>
<tr>
<td>Aluminum hydroxide</td>
<td>21645-51-2</td>
<td>0 - 10</td>
</tr>
<tr>
<td>Zirconium dioxide</td>
<td>1314-23-4</td>
<td>0 - 2</td>
</tr>
</tbody>
</table>

**Composition comments**: Components listed make up an inseparable chemically reacted pigment. Silicon dioxide is present in finished product as amorphous silica. Classification according to GOST 12.1.007-76:


4. First aid measures

**First aid measures for different exposure routes**

**Inhalation**: Move to fresh air. Get medical attention if any discomfort continues.

**Skin contact**: Flush skin thoroughly with water. Get medical attention if irritation develops or persists.
**Eye contact**
Do not rub eyes. Immediately rinse eyes with water. Remove any contact lenses, and continue flushing eyes with running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. Get immediate medical attention.

**Ingestion**
Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Never give anything by mouth to an unconscious person. If ingestion of a large amount does occur, call a poison control center immediately.

**Most important symptoms and effects**
Dusts may irritate the respiratory tract, skin and eyes. Coughing. Frequent inhalation of dust over a long period of time increases the risk of developing lung diseases.

**Notes to physician**
Treat symptomatically.

**General advice**
Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

**General fire hazards**
The product is not flammable.

**Suitable extinguishing media**
Use fire-extinguishing media appropriate for surrounding materials.

**Unsuitable extinguishing media**
No restrictions known.

**Specific hazards during fire fighting**
None known.

**Special fire fighting procedures**
Move containers from fire area if you can do so without risk. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

**Personal protective equipment for fire-fighting**
Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. Accidental release measures

**Personal precautions**
Avoid inhalation of dust and contact with skin and eyes. Wear appropriate protective equipment and clothing during clean-up. Local authorities should be advised if significant spillages cannot be contained.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so. Do not contaminate water.

**Clean-up methods and materials and containment measures**
Avoid dust formation. Collect powder using special dust vacuum cleaner with particle filter or carefully sweep into closed container. Prevent entry into waterways, sewer, basements or confined areas. For waste disposal, see Section 13 of the MSDS.

7. Handling and storage

**Handling**

- **Precautions**
  Avoid inhalation of dust and contact with skin and eyes. Use Personal Protective Equipment recommended in section 8 of the MSDS. Wash thoroughly after handling.

- **Safe handling advice**
  Observe good industrial hygiene practices.

- **Technical measures**
  Avoid dust formation.

- **Local and general ventilation**
  Use with adequate ventilation.

**Storage**

- **Technical measures**
  Store in a well-ventilated place.

- **Suitable storage conditions**
  Titanium dioxide is a stable chemical compound that does not decompose during storage but can pick up moisture from the environment if not stored properly effecting product performance. Store indoors in a dry place, away from rain and wet floors. Use on a first-in first-out basis from receipt of the shipment.

- **Incompatible materials**
  None known.

- **Safe packaging materials**
  Keep in original container.

8. Exposure controls/personal protection

**Occupational exposure limits**

- **Russian Federation. Hygiene Norm GN 2.2.5.1313-03. Executive No. 76 of 30 April 2003. Maximum allowable concentration (MAC) of harmful substances in the air of working zones, as amended.**

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum hydroxide (CAS 21645-51-2)</td>
<td>TWA</td>
<td>6 mg/m3</td>
<td>Aerosol.</td>
</tr>
<tr>
<td>Titanium dioxide (CAS 13463-67-7)</td>
<td>TWA</td>
<td>10 mg/m3</td>
<td>Aerosol.</td>
</tr>
<tr>
<td>Zirconium dioxide (CAS 1314-23-4)</td>
<td>TWA</td>
<td>6 mg/m3</td>
<td>Aerosol.</td>
</tr>
</tbody>
</table>
Engineering measures
Ventilate as needed to control airborne dust. Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust.

Personal protective equipment
Respiratory protection
In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. Seek advice from local supervisor.

Hand protection
Wear suitable gloves. Suitable gloves can be recommended by the glove supplier.

Eye protection
Wear dust-resistant safety goggles where there is risk of eye contact.

Skin and body protection
Risk of contact: Wear appropriate clothing to prevent repeated or prolonged skin contact.

Hygiene measures
Do not breathe dust. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance
White powder.

Physical state
Solid.

Form
Powder.

Color
White.

Odor
Odorless.

Odor threshold
Not applicable.

pH
Not applicable.

Melting point/freezing point
3326 - 3362 °F (1830 - 1850 °C)

Initial boiling point and boiling range
4532 - 5432 °F (2500 - 3000 °C)

Flash point
Not available.

Combustion temperature
Not available.

Auto-ignition temperature
Not available.

Decomposition temperature
Not available.

Flammability (solid, gas)
Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)
Not available.

Flammability limit - upper (%)
Not available.

Vapor pressure
Not available.

Density
Not available.

Viscosity
Not applicable.

Solubility(ies)

Solubility (water)
Insoluble in water.

Partition coefficient (n-octanol/water)
Not applicable.

Evaporation rate
Not available.

Relative density
4.1 Approx. (@ 20°C)

Bulk density
600 kg/m³ Approx. (@ 20°C)

Other data

Explosive properties
Not explosive.

Oxidizing properties
Not oxidizing.

10. Stability and reactivity

Reactivity
The product is stable and non-reactive under normal conditions of use, storage and transport.

Stability
Material is stable under normal conditions.

Possibility of hazardous reactions
Hazardous polymerization does not occur.

Conditions to avoid
Avoid dust formation.

Incompatible materials
None known.

Hazardous decomposition products
No hazardous decomposition products are known.

11. Toxicological information
Acute toxicity

May cause discomfort if swallowed.

### Components

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
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</thead>
<tbody>
<tr>
<td>Aluminum hydroxide (CAS 21645-51-2)</td>
<td>Rat</td>
<td>&gt; 5000 mg/kg</td>
</tr>
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</table>

#### Acute

**Inhalation. Eye contact. Skin contact.**

### Routes of exposure

Dusts or powder may irritate the respiratory tract, skin and eyes. Coughing. Frequent inhalation of dust over a long period of time increases the risk of developing lung diseases.

### Symptoms

Dust may irritate skin. Skin irritation occurs on contact with moist or wet skin.

### Skin corrosion/irritation

Dust may irritate the eyes. Dust in the eyes: Exposed individuals may experience eye tearing, redness, and discomfort.

### Respiratory sensitization

None known.

### Skin sensitization

Not a skin sensitizer.

### Germ cell mutagenicity

No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

### Carcinogenicity

Suspected of causing cancer. IARC has classified TiO₂ as 2B Possibly carcinogenic to humans. However, the only evidence of carcinogenicity is in rats exposed to very high concentrations. Two major epidemiology studies among titanium dioxide workers in the US and in EUROPE could not demonstrate an elevated lung cancer risk.


IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. IARC Monographs, Volume 93 (Summary)

### IARC Monographs. Overall Evaluation of Carcinogenicity

Titanium dioxide (CAS 13463-67-7) 2B Possibly carcinogenic to humans.

Russian Federation. Sanitary-Epidemiological Rules,1.2.2353-08, Chemical substances, mixtures and products which are carcinogenic factors, 21 April 2008

Not listed.

### Toxic to reproduction

None known.

### Specific target organ toxicity - single exposure

None known.

### Specific target organ toxicity - repeated exposure

None known.

### Aspiration hazard

Not classified.

### Chronic effects

Frequent inhalation of dust over a long period of time may increase the risk of developing chronic lung diseases and skin irritation.

### Other information

No other specific acute or chronic health impact noted.

### 12. Ecological information

#### Ecotoxicity

The product is not expected to be hazardous to the environment.

#### Persistence and degradability

The degradability of the product has not been stated.

#### Bioaccumulation

Bioaccumulation is unlikely to be significant because of the low water solubility of this product.

#### Mobility in soil

The product is insoluble in water and will sediment in water systems.

#### Other hazardous effects

Not established.

### 13. Disposal considerations

#### Residual waste

Dispose of in accordance with local regulations.

#### Contaminated packaging

Since emptied containers may retain product residue, follow label warnings even after container is emptied.

#### Local disposal regulations

Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal. Dispose of this material and its container to hazardous or special waste collection point. Do not allow this material to drain into sewers/water supplies.

### 14. Transport information

#### ADR

Not regulated as dangerous goods.
IATA
Not regulated as dangerous goods.

IMDG
Not regulated as dangerous goods.

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

15. Regulatory information

Applicable regulations
This material is not considered to be hazardous according to regulatory guidelines.

Russian Federation. Sanitary-Epidemiological Rules, 1.2.2353-08, Chemical substances, mixtures and products which are carcinogenic factors, 21 April 2008
Not listed.

Ministry of Health and Social Development of Russian Federation. Order № 83 of 16.08.2004. List of hazardous and/or dangerous production factors and work under which preliminary and periodic medical examinations are conducted, methods of the examinations.

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<th>Regulation</th>
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16. Other information

References
HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity

Issued by
Company name: Tronox LLC

Disclaimer
The information in the sheet was written based on the best knowledge and experience currently available.

Nanoparticle Statement - The average primary particle size of this product is larger than the nanoparticle size range as described by ISO/TC 229 and should not be considered as manufactured nanoparticles or nanomaterials. As with other particulate materials there will be a distribution of particle sizes around the average and a small portion of these may be covered by the nanoparticle definition. In this product, the primary particle size is in the 200-300 nm range. However, the primary particle size does not represent the size of particles in this product as supplied since these tend to aggregate or agglomerate into larger particles.

Issue date
17-June-2013

Revision date
13-March-2015