Safety Data Sheet
acc. to U.S. OSHA HCS 2012

Printing date 12/06/2017 **Version 2** **Reviewed on 11/30/2017**

1 Identification

Product identifier
Trade name: **KRONOS Titanium dioxide (all types)**
CAS Number: 13463-67-7
EC number: 236-675-5
Relevant identified uses of the substance or mixture White pigment for application in
Coating materials, printing inks, man-made fibres, plastics, paper, glass, vitreous enamels, ceramic products
Uses advised against None

Details of the supplier of the safety data sheet
Manufacturer/Supplier: KRONOS (US), Inc.
5430 LBJ Freeway, Suite 1700
Dallas, Tx 75240-2397
+1 (972) 233-1700

Emergency telephone number: CHEMTREC: (800) 424-9300
KRONOS: (800) 866-5600

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2 Hazard(s) identification

Classification of the substance or mixture The substance is not classified according to the Globally Harmonized System (GHS).

Label elements
GHS label elements Not applicable
Hazard pictograms Not applicable
Signal word Not applicable
Hazard statements Not applicable

Other hazards Dust load

3 Composition/information on ingredients

Chemical characterization: Substances
CAS No. Description: 13463-67-7 titanium dioxide
EC number: 236-675-5

4 First-aid measures

Description of first aid measures
General information No special measures required.

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

After skin contact Immediately wash with water and soap and rinse thoroughly.

After eye contact Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

(Contd. on page 2)

Safety Data Sheet
acc. to U.S. OSHA HCS 2012

Printing date 12/06/2017 **Version 2** **Reviewed on 11/30/2017**

Trade name: KRONOS Titanium dioxide (all types)

(Contd. of page 1)

After swallowing Rinse out mouth and then drink plenty of water.

Most important symptoms and effects, both acute and delayed No further relevant information available.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

Extinguishing media
Suitable extinguishing agents Use fire fighting measures that suit the environment.
The product is not flammable.

Special hazards arising from the substance or mixture None

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

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6 Accidental release measures

Personal precautions, protective equipment and emergency procedures Not required.

Environmental precautions: No special measures required.

Methods and material for containment and cleaning up: Avoid dust formation. Sweep or vacuum up, use type approved vacuum cleaner.

Reference to other sections See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling
Precautions for safe handling Provide vacuum dust collection if dust is formed.
Information about protection against explosions and fires: The product is not flammable
Titanium dioxide product may be packaged at temperatures of approximately 100 to 120 °C (212 to 248 °F) and stay hot for a long time depending on ambient temperatures and inventory storage practices. Due to the potential of elevated pigment temperature, caution should be used while handling pigment and in solvent applications.

(Contd. on page 3)

Safety Data Sheet
acc. to U.S. OSHA HCS 2012

Printing date 12/06/2017 **Version 2** **Reviewed on 11/30/2017**

Trade name: KRONOS Titanium dioxide (all types)

(Contd. of page 2)

Conditions for safe storage, including any incompatibilities
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: Not required.
Further information about storage conditions: Store in dry conditions.

* **8 Exposure controls/personal protection**

Control parameters
Components with limit values that require monitoring at the workplace:
Additional Occupational Exposure Limit Values for possible hazards during processing:

CAS: 13463-67-7 Titanium dioxide
ACGIH - TLV 10 mg/m³ TWA,
OSHA - PEL 15* mg/m³
*total dust, 8 hr TWA

Exposure controls Use local exhaust ventilation if airborne concentrations would otherwise exceed applicable exposure limits.

Personal protective equipment
General protective and hygienic measures The usual precautionary measures for handling chemicals should be followed. 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.
Use a NIOSH-approved respirator for particulates with N100, P100, or R100 filter.
The respirator must be selected by a technically qualified individual.

Protection of hands: Use gloves appropriate for work conditions to minimize prolonged skin contact and prevent drying and subsequent irritation of skin.
Check protective gloves prior to each use for their proper condition.
Preventive skin protection by use of skin-protecting agents is recommended.

Eye protection: Safety glasses

Body protection: Protective work clothing.

(Contd. on page 4)

Safety Data Sheet
acc. to U.S. OSHA HCS 2012

Printing date 12/06/2017 **Version 2** **Reviewed on 11/30/2017**

Trade name: KRONOS Titanium dioxide (all types)

(Contd. of page 3)

9 Physical and chemical properties

Information on basic physical and chemical properties
General Information
Appearance:

Form:	Powder
Color:	White
Odor:	Odorless
Odor threshold:	Not relevant
pH-value at 20°C (68°F):	7
Melting point/Melting range:	>1800°C (> 3,272°F)
Boiling point/Boiling range:	Not relevant
Flash point:	Not applicable
Flammability (solid, gaseous):	Product is not flammable.
Ignition temperature:	Not applicable
Danger of explosion:	Product is not explosive.
Density:	20°C Anatase 3,9 g/cm³ (30 lbs/ U.S. gal.) Rutile 4,2 g/cm³ (35 lbs/U.S. gal.)
Bulk density:	ca. 500-900 kg/m3 (4.2 - 7.5 lbs/U.S. gal.)
Vapor density	Not applicable.
Evaporation rate	Not applicable.
Solubility in / Miscibility with Water:	Insoluble
Partition coefficient (n-octanol/water):	Not applicable
Viscosity: dynamic:	Not applicable.
Other information	No further relevant information available.

10 Stability and reactivity

Reactivity	The substance is stable under normal use conditions.
Chemical stability	
Thermal decomposition / conditions to be avoided:	No decomposition under normal use conditions.
Possibility of hazardous reactions	No dangerous reactions known

(Contd. on page 5)

Safety Data Sheet
acc. to U.S. OSHA HCS 2012

Printing date 12/06/2017 **Version 2** **Reviewed on 11/30/2017**

Trade name: KRONOS Titanium dioxide (all types)

(Contd. of page 4)

Conditions to avoid No further data; see section 7.

Incompatible materials: No further data; see section 7.

Hazardous decomposition products: No dangerous decomposition products known

* **11 Toxicological information**

Information on toxicological effects

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

Primary irritant effect:
on the skin: OECD 404:
No irritant effect.
Powderized material may dry and mechanically irritate skin.
on the eye: OECD 405:
No irritating effect.
Like any foreign body, particles (dust) can cause mechanical irritation.

Sensitization: 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)

Additional toxicological information: In lifetime inhalation studies of rats, airborne respirable-size titanium dioxide particles have been shown to cause an increase in lung tumors at concentrations associated with substantial particle lung burdens and consequential pulmonary overload and inflammation. The potential for these adverse health effects appears to be closely related to the particle size and the amount of the exposed surface area that comes into contact with the lung.
However, tests with other laboratory animals, such as mice and hamsters, indicate that rats are significantly more susceptible to the pulmonary overload and inflammation that may lead to lung cancer.
Epidemiology studies do not suggest an increased risk of cancer in humans from occupational exposure to titanium dioxide.

(Contd. on page 6)

(Contd. of page 5)

Titanium dioxide has been characterized by IARC as possibly carcinogenic to humans (Group 2B) through inhalation (not ingestion). It has not been characterized as a potential carcinogen by either NTP or OSHA.

Carcinogenic categories

IARC (International Agency for Research on Cancer)

2B

NTP (National Toxicology Program)

Substance is not listed.

OSHA-Ca (Occupational Safety & Health Administration)

Substance is not listed.

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.

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12 Ecological information

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

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:

(Contd. on page 7)

Safety Data Sheet
acc. to U.S. OSHA HCS 2012

Printing date 12/06/2017 **Version 2** **Reviewed on 11/30/2017**

Trade name: KRONOS Titanium dioxide (all types)

(Contd. of page 6)

Corophium volutator NOEC (10 d): ≥ 14989 mg/kg sediment dw (semi-static, OSPARCOM guidelines (1995))

Persistence and degradability Not relevant for inorganic substances.

Bioaccumulative potential Does not accumulate in organisms

Mobility in soil The substance is immobile in soil.

Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Material is not a hazardous waste.
Disposal must be made according to all federal, state, and local (municipal) regulations.

Uncleaned packagings:
Recommendation: Material is not a hazardous waste.
Disposal must be made according to all federal, state, and local (municipal) regulations.

14 Transport information

UN-Number
DOT, ADR/RID/ADN, ADN, IMDG, IATA Not applicable
UN proper shipping name
DOT, ADR/RID/ADN, ADN, IMDG, IATA Not applicable
Transport hazard class(es)

DOT, ADR/RID/ADN, ADN, IMDG, IATA
Class Not applicable
Packing group
DOT, ADR/RID/ADN, IMDG, IATA Not applicable
Environmental hazards: Not an environmentally hazardous substance.
Special precautions for user Not applicable.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

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15 Regulatory information

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

SARA
Section 355 (Extremely hazardous substances):
Substance is not listed
Section 313 (Specific toxic chemical listings):
Substance is not listed

(Contd. on page 8)

Safety Data Sheet
acc. to U.S. OSHA HCS 2012

Printing date 12/06/2017 **Version 2** **Reviewed on 11/30/2017**

Trade name: KRONOS Titanium dioxide (all types)

(Contd. of page 7)

TSCA and Canada DSL Status:

Substance is listed

Proposition 65
Chemicals known to cause cancer:

CAS: 13463-67-7 Titanium dioxide

Additional information: The listing is for titanium dioxide as "airborne, unbound particles of respirable size" and does not cover titanium dioxide when it remains within a product matrix.

Carcinogenic categories
EPA (Environmental Protection Agency)

Substance is not listed.

TLV (Threshold Limit Value Notation established by ACGIH)

A4 Not classifiable as human carcinogen

NIOSH-Ca (National Institute for Occupational Safety and Health)

Substance is listed.

REACH registration number: 01-2119489379-17-xxxx

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.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Contact:
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Abbreviations and acronyms:
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
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
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
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit

*** Data compared to the previous version altered.** Conformed to U.S. OSHA HCS 2012