

# SAFETY DATA SHEET



## Ti-Pure™ TS-1510 Titanium Dioxide Pigment

Version 3.0	Revision Date: 2023/12/05	SDS Number (Internal): 10869410-00003	Date of last issue: 2023/04/12 Date of first issue: 2022/10/24
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### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Ti-Pure™ TS-1510 Titanium Dioxide Pigment

SDS-Identcode : 130000149917

#### Recommended use of the chemical and restrictions on use

Recommended use : Colouring agent  
Pigment

Restrictions on use : For industrial use only.

#### Manufacturer or supplier's details

Company : Chemours Korea Inc.

Address : 12FL, Majestarcity Tower 1, 12, Seocho-daero 38-gil, Seocho-gu, Seoul 06655, Korea

Telephone : 82-2-2015-5000

Emergency telephone number : 080-880-0454

Telefax : 82-2-2015-5091

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### 2. HAZARDS IDENTIFICATION

#### GHS Classification

This material is not classified as hazardous under the Article 104 of the Occupational Safety and Health Act (OSHA). It is not regulated for the MSDS creation and labeling by the provision of Article 110 Paragraph 1 of the OSHA.

#### GHS label elements

This material is not classified as hazardous under the Article 104 of the Occupational Safety and Health Act (OSHA). It is not regulated for the MSDS creation and labeling by the provision of Article 110 Paragraph 1 of the OSHA.

Hazard pictograms	: Not applicable
Signal word	: Not applicable
Hazard statements	: Not applicable
Precautionary statements	: <b>Prevention:</b> P264 Wash skin thoroughly after handling.

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### Disposal:

P501 Dispose of contents/ container according to waste-related laws

### Other hazards which do not result in classification

No data available

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

### Components

Chemical name	Common Name	CAS-No.	Concentration (% w/w)
Titanium dioxide	No data available	13463-67-7	$\geq 90 - \leq 100$
Aluminum oxide	No data available	1344-28-1	$\geq 0.1 - < 1$
Trimethylolpropane	No data available	77-99-6	$\geq 0.3 - < 1$
Aluminium hydroxide	No data available	21645-51-2	$\geq 0.1 - < 1$
Silicon dioxide, amorphous	Silica	7631-86-9	$< 0.1$

## 4. FIRST AID MEASURES

General advice	: In the case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt seek medical advice.
In case of eye contact	: Flush eyes with water as a precaution. Get medical attention if irritation develops and persists.
In case of skin contact	: In case of contact, immediately flush skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
If inhaled	: If inhaled, remove to fresh air. Get medical attention.
If swallowed	: If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water.

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Most important symptoms and effects, both acute and delayed : irritant effects

Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists (see section 8).

Notes to physician : Treat symptomatically and supportively.

### 5. FIREFIGHTING MEASURES

#### Suitable and unsuitable extinguishing media

Suitable extinguishing media : Not applicable  
Will not burn

Unsuitable extinguishing media : Not applicable  
Will not burn

Specific hazards during fire-fighting : Exposure to combustion products may be a hazard to health.

Hazardous combustion products : No hazardous combustion products are known

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.  
Use water spray to cool unopened containers.  
Remove undamaged containers from fire area if it is safe to do so.  
Evacuate area.

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.  
Use personal protective equipment.

### 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.  
Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

Environmental precautions : Avoid release to the environment.  
Prevent further leakage or spillage if safe to do so.  
Retain and dispose of contaminated wash water.  
Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up : Sweep up or vacuum up spillage and collect in suitable container for disposal.

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Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

### 7. HANDLING AND STORAGE

- Technical measures : See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
- Local/Total ventilation : Use only with adequate ventilation.
- Advice on safe handling : Do not swallow.  
Avoid contact with eyes.  
Avoid prolonged or repeated contact with skin.  
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment  
Take care to prevent spills, waste and minimize release to the environment.
- Conditions for safe storage : Keep in properly labelled containers.  
Store in accordance with the particular national regulations.
- Materials to avoid : No special restrictions on storage with other products.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Titanium dioxide	13463-67-7	TWA	10 mg/m3	KR OEL
		TWA (Respirable particulate matter)	2.5 mg/m3 (Titanium dioxide)	ACGIH
Aluminum oxide	1344-28-1	TWA	10 mg/m3	KR OEL
		TWA (Respirable particulate matter)	1 mg/m3 (Aluminium)	ACGIH
Aluminium hydroxide	21645-51-2	TWA	2 mg/m3 (Aluminium)	KR OEL
		TWA (Respirable par-	1 mg/m3 (Aluminium)	ACGIH

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		ticulate matter)		
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Other ingredients, which are listed in section 3 but not listed in this section, do not have established occupational exposure limit values.

**Engineering measures** : Ensure adequate ventilation, especially in confined areas.  
Minimize workplace exposure concentrations.

**Personal protective equipment. Among the following personal protective equipment, the PPEs which require safety certification need to be certified by KOSHA.**

**Respiratory protection** : Use respiratory protection (dust mask) unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

**Filter type** : Particulates type

**Eye protection** : Wear the following personal protective equipment:  
Safety glasses

**Hand protection**

**Material** : Chemical-resistant gloves

**Remarks** : Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

**Skin and body protection** : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.  
Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

**Hygiene measures** : If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place.  
When using do not eat, drink or smoke.  
Wash contaminated clothing before re-use.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance** : crystalline

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Colour	:	white
Odour	:	odourless
Odour Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	1,843 °C
Initial boiling point and boiling range	:	3,000 °C
Flash point	:	Not applicable
Evaporation rate	:	Not applicable
Flammability (solid, gas)	:	Will not burn  Not expected to form explosive dust-air mixtures.
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapour pressure	:	Not applicable
Solubility(ies) Water solubility	:	insoluble
Relative vapour density	:	Not applicable
Relative density	:	3.6 - 4.3
Partition coefficient: n-octanol/water	:	Not applicable
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity Viscosity, kinematic	:	Not applicable

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Explosive properties	: Not explosive
Oxidizing properties	: The substance or mixture is not classified as oxidizing.
Molecular weight	: No data available
Particle size	: No data available

### 10. STABILITY AND REACTIVITY

Chemical stability and possibility of hazardous reactions	: Not classified as a reactivity hazard. Stable under normal conditions. None known.
Conditions to avoid	: None known.
Incompatible materials	: None.
Hazardous decomposition products	: No hazardous decomposition products are known.

### 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	: Skin contact Ingestion Eye contact
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#### Health hazard information

##### Acute toxicity

|| No data available

##### Components:

##### Titanium dioxide:

Acute oral toxicity	: LD50 (Rat): > 5,000 mg/kg Method: OECD Test Guideline 425
Acute inhalation toxicity	: LC50 (Rat): > 6.82 mg/l Exposure time: 4 h Test atmosphere: dust/mist Assessment: The substance or mixture has no acute inhalation toxicity
Acute dermal toxicity	: Acute toxicity estimate (Rat): > 2,000 mg/kg Method: Expert judgement Assessment: The substance or mixture has no acute dermal toxicity

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### Aluminum oxide:

Acute oral toxicity	: LD50 (Rat): > 10,000 mg/kg Method: OECD Test Guideline 401
Acute inhalation toxicity	: LC50 (Rat): > 5.09 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 403 Assessment: The substance or mixture has no acute inhalation toxicity Remarks: Based on data from similar materials

### Trimethylolpropane:

Acute oral toxicity	: LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	: LC50 (Rat): > 0.85 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	: LD50 (Rabbit): > 5,000 mg/kg

### Aluminium hydroxide:

Acute oral toxicity	: LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 423 Assessment: The substance or mixture has no acute oral toxicity
Acute inhalation toxicity	: LC50 (Rat): > 5.09 mg/l Exposure time: 4 h Test atmosphere: dust/mist Assessment: The substance or mixture has no acute inhalation toxicity Remarks: Based on data from similar materials

### Silicon dioxide, amorphous:

Acute oral toxicity	: LD50 (Rat): > 5,000 mg/kg Method: OECD Test Guideline 401
Acute inhalation toxicity	: LC50 (Rat): > 2.08 mg/l Exposure time: 4 h Test atmosphere: dust/mist Assessment: The substance or mixture has no acute inhalation toxicity
Acute dermal toxicity	: LD50 (Rabbit): > 5,000 mg/kg

### Skin corrosion/irritation

No data available



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### Components:

#### **Titanium dioxide:**

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: No skin irritation

#### **Aluminum oxide:**

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: No skin irritation

#### **Trimethylolpropane:**

Species	: Rabbit
Result	: No skin irritation

#### **Aluminium hydroxide:**

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: No skin irritation

#### **Silicon dioxide, amorphous:**

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: No skin irritation

### **Serious eye damage/eye irritation**

|| No data available

### Components:

#### **Titanium dioxide:**

Species	: Rabbit
Result	: No eye irritation
Method	: OECD Test Guideline 405

#### **Aluminum oxide:**

Species	: Rabbit
Result	: No eye irritation

#### **Trimethylolpropane:**

Species	: Rabbit
Result	: No eye irritation

#### **Aluminium hydroxide:**

Species	: Rabbit
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Result	: No eye irritation
Method	: OECD Test Guideline 405

### Silicon dioxide, amorphous:

Species	: Rabbit
Result	: No eye irritation
Method	: OECD Test Guideline 405

### Respiratory or skin sensitisation

#### Respiratory sensitisation

No data available

#### Skin sensitisation

No data available

### Components:

#### Titanium dioxide:

Test Type	: Buehler Test
Exposure routes	: Skin contact
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: negative

Test Type	: Local lymph node assay (LLNA)
Exposure routes	: Skin contact
Species	: Mouse
Method	: OECD Test Guideline 429
Result	: negative

Exposure routes	: Inhalation
Species	: Mouse
Result	: negative

Exposure routes	: Inhalation
Species	: Humans
Result	: negative

#### Aluminum oxide:

Exposure routes	: Skin contact
Species	: Guinea pig
Result	: negative

#### Trimethylolpropane:

Test Type	: Local lymph node assay (LLNA)
Exposure routes	: Skin contact
Species	: Mouse
Method	: OECD Test Guideline 429

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**Result** : negative

### Aluminium hydroxide:

Test Type	: Maximisation Test
Exposure routes	: Skin contact
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: negative

### Carcinogenicity

**No data available**

### Product:

#### Remarks

: In lifetime inhalation studies rats were exposed for 2 years to respectively 10, 50 and 250 mg/m<sup>3</sup> of respirable TiO<sub>2</sub>. Slight lung fibrosis was observed at 50 and 250 mg/m<sup>3</sup> levels. Microscopic lung tumours were also observed in 13 percent of the rats exposed to 250 mg/m<sup>3</sup>, an exposure level that caused lung overloading and impairment of rat lungs clearance mechanisms.

In further studies, these tumours were found to occur only under particle overload conditions in a uniquely sensitive species, the rat, and have little or no relevance for humans. The pulmonary inflammatory response to TiO<sub>2</sub> particles exposure was also found to be much more severe in rats than in other rodent species.

In February 2006, IARC has re-evaluated Titanium dioxide as pertaining to Group 2B: "possibly carcinogenic to humans", based upon inadequate evidence in humans and sufficient evidence in experimental animals for the carcinogenicity of titanium dioxide. IARC evaluation guidelines consider the generation of tumours, in 2 different studies within the same animal species, to be adequate criteria for an assessment of sufficient evidence.

The conclusions of several epidemiology studies on more than 20000 TiO<sub>2</sub> industry workers in Europe and the USA did not suggest a carcinogenic effect of TiO<sub>2</sub> dust on the human lung. Mortality from other chronic diseases, including other respiratory diseases, was also not associated with exposure to TiO<sub>2</sub> dust.

Based upon all available study results, Chemours scientists conclude that titanium dioxide will not cause lung cancer or chronic respiratory diseases in humans at concentrations experienced in the workplace.

### Components:

#### Titanium dioxide:

**No data available**

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Species	: Rat
Application Route	: inhalation (dust/mist/fume)
Exposure time	: 2 Years
Result	: negative

Species	: Rat
Application Route	: Ingestion
Exposure time	: 105 weeks
Result	: negative

Species	: Mouse
Application Route	: Ingestion
Exposure time	: 103 weeks
Result	: negative

Carcinogenicity - Assessment	: Weight of evidence does not support classification as a carcinogen
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### Aluminum oxide:

No data available

Carcinogenicity - Assessment	: Weight of evidence does not support classification as a carcinogen
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### Trimethylolpropane:

No data available

### Aluminium hydroxide:

No data available

Species	: Rat
Application Route	: inhalation (dust/mist/fume)
Exposure time	: 86 weeks
Result	: negative
Remarks	: Based on data from similar materials

### Silicon dioxide, amorphous:

No data available

Species	: Rat
Application Route	: Ingestion
Exposure time	: 103 weeks
Result	: negative

Carcinogenicity - Assessment	: Weight of evidence does not support classification as a carcinogen
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**Germ cell mutagenicity**

|| No data available

**Components:****Titanium dioxide:**

|| No data available

Genotoxicity in vitro	:	<p>Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negative</p> <p>Test Type: In vitro mammalian cell gene mutation test Method: OECD Test Guideline 476 Result: negative</p> <p>Test Type: Chromosome aberration test in vitro Method: OECD Test Guideline 473 Result: negative</p> <p>Test Type: comet assay Method: OPPTS 870.5140 Result: positive</p>
Genotoxicity in vivo	:	<p>Test Type: In vivo mammalian alkaline comet assay Species: Rat Application Route: intratracheal Method: OECD Test Guideline 489 Result: negative</p> <p>Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Rat Application Route: Ingestion Method: OECD Test Guideline 474 Result: negative</p> <p>Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis) Species: Mouse Application Route: Intraperitoneal injection Method: OECD Test Guideline 475 Result: negative</p> <p>Test Type: Transgenic rodent germ cell gene mutation assay Species: Mouse Application Route: Intravenous injection Method: OECD Test Guideline 488 Result: negative</p>
Germ cell mutagenicity- Assessment	:	Weight of evidence does not support classification as a germ cell mutagen.

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### Aluminum oxide:

|| No data available

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Germ cell mutagenicity- Assessment : Weight of evidence does not support classification as a germ cell mutagen.

### Trimethylolpropane:

|| No data available

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Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative

### Aluminium hydroxide:

|| No data available

||

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative

Test Type: Chromosome aberration test in vitro  
Result: positive  
Remarks: Based on data from similar materials

Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)  
Result: equivocal  
Remarks: Based on data from similar materials

Test Type: in vitro micronucleus test  
Result: positive  
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 474  
Result: negative

### Silicon dioxide, amorphous:

|| No data available

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Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative

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Genotoxicity in vivo : Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)  
Species: Rat  
Application Route: Ingestion  
Result: negative

Germ cell mutagenicity- Assessment : Weight of evidence does not support classification as a germ cell mutagen.

### Reproductive toxicity

No data available

#### Components:

##### **Titanium dioxide:**

No data available

Effects on fertility : Test Type: One-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 443  
Result: negative

Effects on foetal development : Test Type: Prenatal development toxicity study (teratogenicity)  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 414  
Result: negative

Reproductive toxicity - Assessment : Weight of evidence does not support classification for reproductive toxicity

##### **Aluminum oxide:**

No data available

Reproductive toxicity - Assessment : Weight of evidence does not support classification for reproductive toxicity, Based on data from similar materials

##### **Trimethylolpropane:**

Suspected of damaging fertility or the unborn child.

Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Result: positive

Effects on foetal development : Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 443  
Result: positive

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Reproductive toxicity - Assessment : Some evidence of adverse effects on sexual function and fertility, based on animal experiments., Some evidence of adverse effects on development, based on animal experiments.

### Aluminium hydroxide:

No data available

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 422  
Result: negative  
Remarks: Based on data from similar materials

Effects on foetal development : Test Type: Embryo-foetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative

### Silicon dioxide, amorphous:

No data available

Effects on foetal development : Test Type: Embryo-foetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative

Reproductive toxicity - Assessment : Weight of evidence does not support classification for reproductive toxicity

### STOT - single exposure

No data available

### Components:

#### Titanium dioxide:

Exposure routes : Skin contact  
Assessment : No significant health effects observed in animals at concentrations of 2000 mg/kg bw or less

Exposure routes : Ingestion  
Assessment : No significant health effects observed in animals at concentrations of 2000 mg/kg bw or less

Exposure routes : inhalation (dust/mist/fume)  
Assessment : No significant health effects observed in animals at concentrations of 5.0 mg/l/4h or less



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### STOT - repeated exposure

|| No data available

#### Components:

##### Titanium dioxide:

|| Exposure routes : Ingestion  
|| Assessment : No significant health effects observed in animals at concentrations of 100 mg/kg bw or less.

|| Exposure routes : inhalation (dust/mist/fume)  
|| Assessment : No significant health effects observed in animals at concentrations of 0.2 mg/l/6h/d or less.

|| Exposure routes : Ingestion  
|| Assessment : No significant health effects observed in animals at concentrations of 200 mg/kg bw or less.

##### Aluminum oxide:

|| Assessment : No significant health effects observed in animals at concentrations of 0.2 mg/l/6h/d or less.

### Repeated dose toxicity

#### Components:

##### Titanium dioxide:

|| Species : Rat, male and female  
|| NOAEL : 24,000 mg/kg  
|| LOAEL : > 24,000 mg/kg  
|| Application Route : Ingestion  
|| Exposure time : 28 Days  
|| Method : OECD Test Guideline 407  
|| Remarks : No significant adverse effects were reported

|| Species : Rat, male and female  
|| NOAEL : 0.01 mg/l  
|| LOAEL : 0.5 mg/l  
|| Application Route : inhalation (dust/mist/fume)  
|| Exposure time : 24 Months  
|| Method : OECD Test Guideline 453  
|| Remarks : No significant adverse effects were reported

|| Species : Rat, male and female  
|| NOAEL : 962 mg/kg  
|| LOAEL : > 962 mg/kg  
|| Application Route : Ingestion  
|| Exposure time : 90 Days  
|| Method : OECD Test Guideline 408

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Remarks : No significant adverse effects were reported

### Aluminum oxide:

Species : Rat  
NOAEL : 141 mg/kg  
LOAEL : > 141 mg/kg  
Application Route : Ingestion  
Exposure time : 28 d  
Remarks : No significant adverse effects were reported  
Based on data from similar materials

Species : Rat  
NOAEL : 0.070 mg/l  
LOAEL : > 0.07 mg/l  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 180 d  
Method : OECD Test Guideline 413  
Remarks : No significant adverse effects were reported  
Based on data from similar materials

### Trimethylolpropane:

Species : Rat  
NOAEL : 67 mg/kg  
Application Route : Ingestion  
Exposure time : 90 Days

### Aluminium hydroxide:

Species : Rat  
NOAEL : > 100 mg/kg  
Application Route : Ingestion  
Exposure time : 364 Days  
Method : OECD Test Guideline 426  
Remarks : Based on data from similar materials

Species : Rat  
NOAEL : > 0.2 mg/kg  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 12 Months  
Remarks : Based on data from similar materials

### Silicon dioxide, amorphous:

Species : Rat  
NOAEL : 1.3 mg/m3  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 13 Weeks

### Aspiration toxicity

No data available

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### Components:

#### **Titanium dioxide:**

|| No aspiration toxicity classification

#### **Experience with human exposure**

No data available

#### **Toxicology, Metabolism, Distribution**

No data available

#### **Neurological effects**

No data available

#### **Further information**

No data available

## 12. ECOLOGICAL INFORMATION

### **Ecotoxicity**

#### Components:

#### **Titanium dioxide:**

Toxicity to fish	: LC50 (Fish): > 1,000 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
	LC50 (Marine species): > 10,000 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	: EC50 (Daphnia sp. (water flea)): > 1,000 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
	EC50 (No species specified): > 1,000 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	: ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
	EC50 (Skeletonema costatum (marine diatom)): > 10,000 mg/l Exposure time: 72 h Method: ISO 10253
	NOEC (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l

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Exposure time: 3 d  
Method: OECD Test Guideline 201

NOEC (Skeletonema costatum (marine diatom)): 5,600 mg/l  
Exposure time: 3 d  
Method: ISO 10253

### Aluminum oxide:

Toxicity to fish	: LC50 (Pimephales promelas (fathead minnow)): Exposure time: 96 h Remarks: No toxicity at the limit of solubility Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	: LC50 (Ceriodaphnia dubia (water flea)): Exposure time: 48 h Remarks: No toxicity at the limit of solubility Based on data from similar materials
Toxicity to algae/aquatic plants	: EC50 (Pseudokirchneriella subcapitata (green algae)): Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: No toxicity at the limit of solubility Based on data from similar materials
	NOEC (Pseudokirchneriella subcapitata (green algae)): Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: No toxicity at the limit of solubility
Toxicity to fish (Chronic toxicity)	: NOEC (Pimephales promelas (fathead minnow)): Exposure time: 7 d Remarks: No toxicity at the limit of solubility Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	: NOEC (Daphnia magna (Water flea)): Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: No toxicity at the limit of solubility Based on data from similar materials

### Ecotoxicology Assessment

Acute aquatic toxicity	: No toxicity at the limit of solubility
Chronic aquatic toxicity	: No toxicity at the limit of solubility

### Trimethylolpropane:

Toxicity to fish	: LC50 (Oryzias latipes (Orange-red killifish)): > 1,000 mg/l Exposure time: 96 h
Toxicity to daphnia and other	: EC50 (Daphnia magna (Water flea)): 13,000 mg/l

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aquatic invertebrates	Exposure time: 48 h
Toxicity to algae/aquatic plants	: EC50 (Pseudokirchneriella subcapitata (green algae)): > 1,000 mg/l Exposure time: 72 h
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	: NOEC (Daphnia magna (Water flea)): > 1,000 mg/l Exposure time: 21 d
Toxicity to microorganisms	: EC50: > 1,000 mg/l Exposure time: 3 h

### Aluminium hydroxide:

Toxicity to fish	: LL50 (Salmo trutta (brown trout)): > 100 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	: EL50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h
Toxicity to algae/aquatic plants	: EL50 (Selenastrum capricornutum (green algae)): > 100 mg/l Exposure time: 96 h

### Silicon dioxide, amorphous:

Toxicity to fish	: LC50 (Danio rerio (zebra fish)): > 10,000 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	: EC50 (Daphnia magna (Water flea)): > 1,000 mg/l Exposure time: 24 h Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	: EC50 (Desmodesmus subspicatus (green algae)): > 10,000 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials  NOEC (Desmodesmus subspicatus (green algae)): 10,000 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials

### Persistence and degradability

#### Components:

#### Trimethylolpropane:

Biodegradability	: Result: Not readily biodegradable.
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Biodegradation: 6 %  
Exposure time: 28 d

### Bioaccumulative potential

#### Components:

##### Titanium dioxide:

Bioaccumulation : Species: Oncorhynchus mykiss (rainbow trout)  
Bioconcentration factor (BCF): 352

##### Aluminum oxide:

Bioaccumulation : Remarks: The product may be accumulated in organisms.  
Based on data from similar materials

##### Trimethylolpropane:

Partition coefficient: n-octanol/water : log Pow: -0.47

### Mobility in soil

No data available

### Other adverse effects

No data available

## 13. DISPOSAL CONSIDERATIONS

### Disposal methods

Waste from residues : Dispose of contents and container according to wastes control act.

Do not dispose of waste into sewer.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.  
If not otherwise specified: Dispose of as unused product.

### Disposal precautions

Dispose of contents and container according to wastes control act.

## 14. TRANSPORT INFORMATION

### International Regulations

#### UNRTDG

UN number : Not applicable  
Proper shipping name : Not applicable

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Class : Not applicable  
Subsidiary risk : Not applicable  
Packing group : Not applicable  
Labels : Not applicable

### IATA-DGR

UN/ID No. : Not applicable  
Proper shipping name : Not applicable  
Class : Not applicable  
Subsidiary risk : Not applicable  
Packing group : Not applicable  
Labels : Not applicable  
Packing instruction (cargo aircraft) : Not applicable  
Packing instruction (passenger aircraft) : Not applicable

### IMDG-Code

UN number : Not applicable  
Proper shipping name : Not applicable  
Class : Not applicable  
Subsidiary risk : Not applicable  
Packing group : Not applicable  
Labels : Not applicable  
EmS Code : Not applicable  
Marine pollutant : Not applicable

### Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

### National Regulations

Refer to section 15 for specific national regulation.

### Special precautions for user

Not applicable

## 15. REGULATORY INFORMATION

### National regulatory information

#### Regulation under the Occupational Safety and Health Act

#### Harmful Substances Prohibited from Manufacturing

Not applicable

#### Harmful Substances Required Permission for Manufacture

Not applicable

#### Harmful Agents to be kept below Occupational Exposure Limits

Chemical name	CAS-No.
Titanium dioxide	13463-67-7
α-Alumina	1344-28-1
Aluminum (Soluble salts)	21645-51-2

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### Harmful Agents Required to be kept below Permission Levels

Not applicable

### Hazardous substances requiring management

Chemical name	CAS-No.	Threshold limits (%)
Titanium dioxide	13463-67-7	$\geq 1\%$

### Special Management Materials

Not applicable

### Controlled Substances Subject to Environment Monitoring

Chemical name	CAS-No.	Threshold limits (%)
Titanium dioxide	13463-67-7	$\geq 1\%$
Aluminum and its compounds	1344-28-1	$\geq 1\%$
Mineral dusts	1344-28-1	
Silica	7631-86-9	

### Controlled Substances Subject to Health Examination

Chemical name	CAS-No.	Threshold limits (%)
Mineral dusts	13463-67-7	
Aluminum and its compounds	1344-28-1	$\geq 1\%$
Mineral dusts	1344-28-1	

### Hazardous Substances Subject to Process Safety Management (PSM) Reporting Obligation

Not applicable

### Regulation under the Chemicals Control Act

#### Toxic Chemicals

Not applicable

#### Restricted Chemicals

Not applicable

#### Prohibited Chemicals

Not applicable

#### Toxic Release Inventory

Not applicable

#### Accident Precaution Chemicals

Not applicable

#### Dangerous Substances Safety Management Act

Not Applicable to Dangerous Materials

#### Wastes Control Act

Industrial general wastes

Follow article 13 of the act to dispose the product waste

## 16. OTHER INFORMATION



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### Further information

Sources of key data used to compile the Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

Issuing date : 2022/10/24

### Revision number and date

Number of Revision : 2

Revision Date : 2023/12/05

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

Date format : yyyy/mm/dd

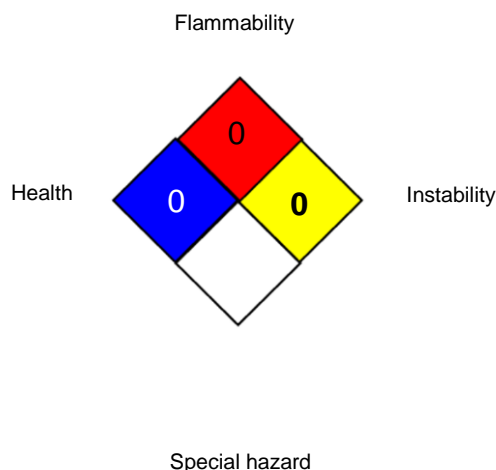
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### NFPA:



### Full text of other abbreviations

ACGIH : USA. ACGIH Threshold Limit Values (TLV)  
KR OEL : Harmful Agents to be kept below Occupational Exposure Limits

ACGIH / TWA : 8-hour, time-weighted average  
KR OEL / TWA : Time Weighted Average

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No

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1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

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