

SAFETY DATA SHEET



Ti-Pure™ R-104 Titanium Dioxide Pigment

Version 9.1	Revision Date: 2023/10/25	SDS Number (Internal): 1560715-00021	Date of last issue: 2023/09/28 Date of first issue: 2017/04/21
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1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Ti-Pure™ R-104 Titanium Dioxide Pigment

SDS-Identcode : 130000030906

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

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 : **Prevention:**
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	$\geq 90 - \leq 100$
Inorganic metal oxide	Proprietary Ingredient	Proprietary Ingredient	$\geq 0.1 - < 1$
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

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	: Wash with water and soap as a precaution. Get medical attention if symptoms occur.
If inhaled	: If inhaled, remove to fresh air. Get medical attention if symptoms occur.
If swallowed	: If swallowed, DO NOT induce vomiting. Get medical attention if symptoms occur. Rinse mouth thoroughly with water.
Most important symptoms and effects, both acute and delayed	: irritant effects
Protection of first-aiders	: No special precautions are necessary for first aid responders.
Notes to physician	: Treat symptomatically and supportively.

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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 : Wear self-contained breathing apparatus for firefighting if necessary.
Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : 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.
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

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- Technical measures : See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
- Local/Total ventilation : Use only with adequate ventilation.
- Advice on safe handling : 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
Inorganic metal oxide	Proprietary Ingredient	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 particulate matter)	1 mg/m3 (Aluminium)	ACGIH

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

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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	:	Not applicable
Remarks	:	Wash hands before breaks and at the end of workday.
Skin and body protection	:	Skin should be washed after contact.
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
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

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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 : The substance or mixture is not classified self-reactive.

Viscosity
Viscosity, kinematic : Not applicable

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

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Information on likely routes of exposure : Skin contact
Ingestion
Eye contact

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

Inorganic metal 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

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

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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

Components:

Titanium dioxide:

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

Inorganic metal oxide:

Species : Rabbit
Method : OECD Test Guideline 404
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

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Inorganic metal oxide:

Species	: Rabbit
Result	: No eye irritation

Aluminium hydroxide:

Species	: Rabbit
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

Inorganic metal oxide:

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

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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/m³ of respirable TiO₂. Slight lung fibrosis was observed at 50 and 250 mg/m³ levels. Microscopic lung tumours were also observed in 13 percent of the rats exposed to 250 mg/m³, 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 TiO₂ 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 TiO₂ industry workers in Europe and the USA did not suggest a carcinogenic effect of TiO₂ dust on the human lung. Mortality from other chronic diseases, including other respiratory diseases, was also not associated with exposure to TiO₂ 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

Species : Rat

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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

Inorganic metal oxide:

No data available

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

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

Germ cell mutagenicity

No data available

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Components:

Titanium dioxide:

No data available

Genotoxicity in vitro	: <ul style="list-style-type: none">Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negativeTest Type: In vitro mammalian cell gene mutation test Method: OECD Test Guideline 476 Result: negativeTest Type: Chromosome aberration test in vitro Method: OECD Test Guideline 473 Result: negativeTest Type: comet assay Method: OPPTS 870.5140 Result: positive
Genotoxicity in vivo	: <ul style="list-style-type: none">Test Type: In vivo mammalian alkaline comet assay Species: Rat Application Route: intratracheal Method: OECD Test Guideline 489 Result: negativeTest Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Rat Application Route: Ingestion Method: OECD Test Guideline 474 Result: negativeTest Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis) Species: Mouse Application Route: Intraperitoneal injection Method: OECD Test Guideline 475 Result: negativeTest Type: Transgenic rodent germ cell gene mutation assay Species: Mouse Application Route: Intravenous injection Method: OECD Test Guideline 488 Result: negative
Germ cell mutagenicity- Assessment	: Weight of evidence does not support classification as a germ cell mutagen.

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Inorganic metal oxide:

No data available

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

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

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

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.

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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 |

Inorganic metal oxide:

No data available

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

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 |
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ment

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

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.

Inorganic metal oxide:

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

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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
Remarks	: No significant adverse effects were reported

Inorganic metal 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

Aluminium hydroxide:

Species	: Rat
NOAEL	: > 100 mg/kg

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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

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

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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
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

Inorganic metal 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

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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

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

No data available

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Bioaccumulative potential

Components:

Titanium dioxide:

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

Inorganic metal oxide:

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

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
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

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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
Inorganic metal oxide	Proprietary Ingredient
Aluminum (Soluble salts)	21645-51-2

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	>= 1 %

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Special Management Materials

Not applicable

Controlled Substances Subject to Environment Monitoring

Chemical name	CAS-No.	Threshold limits (%)
Titanium dioxide	13463-67-7	$\geq 1\%$
Inorganic metal oxide	Proprietary Ingredient	$\geq 1\%$
Silica	7631-86-9	

Controlled Substances Subject to Health Examination

Chemical name	CAS-No.	Threshold limits (%)
Mineral dusts	13463-67-7	
Inorganic metal oxide	Proprietary Ingredient	$\geq 1\%$

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

Other information : Ti-Pure™ and any associated logos are trademarks or copyrights of The Chemours Company FC, LLC. Chemours™ and the Chemours Logo are trademarks of The Chemours Company. Before use read Chemours safety information. For further information contact the local Chemours office or

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nominated distributors.

These products may not be directly added to food, pharmaceuticals, cosmetics, or cigarette papers/filters for tobacco products.

Do not use or resell Chemours™ materials in medical applications involving implantation in the human body or contact with internal body fluids or tissues unless agreed to by Seller in a written agreement covering such use. For further information, please contact your Chemours representative.

An electrostatic charge can potentially build up when pouring or conveying product from plastic bags. Do not use plastic bags in the presence of flammable or explosive vapors.

In the manufacture of titanium dioxide, product is packaged at temperatures of approximately 100 to 120°C (212 to 248°F).

When pigment is shipped shortly after manufacture, it may stay hot for a very long time depending on ambient temperatures and inventory storage practices. Use caution while handling hot pigment to prevent burns to personnel. Use caution in solvent applications to prevent ignition of solvent.

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 : 2017/04/21

Revision number and date

Number of Revision : 20

Revision Date : 2023/10/25

Date format : yyyy/mm/dd

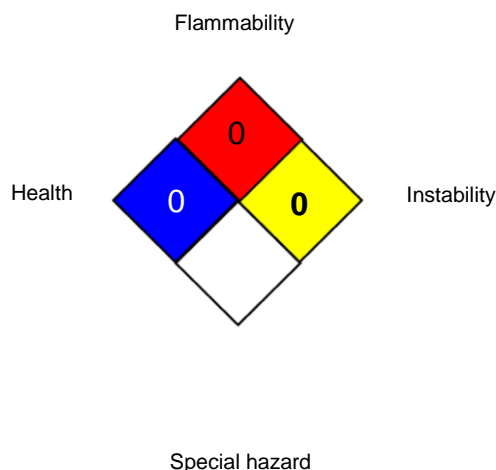
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NFPA:



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

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

KR / EN

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Decree of the Ministry of Environment Under the Act on the Registration and Evaluation, Etc. of Chemical Substances [Annex No. 26]

Chemical Safety Information(Risk Information)

Provider	Company name: Chemours Korea Inc.	Business Reg. No.: 220-88-81323		
	Name : Rim Young Kyu (Company Rep.)	Name of Person in charge and Contact no.: Kwack Woo Yong (email : tyler.kwack@chemours.com)		
	Address : 12FL, Majestarcity Tower 1, 12, Seocho-daero 38-gil, Seocho-gu, Seoul, Korea (Business location)			

Chemical information	Chemical name(generic name)	Titanium dioxide		
	Identification No. (CAS No., etc.)	13463-667-7	Trade name	
	Registration number(※ May be omitted for hazardous substance which is not registered)	04-2112-03750	Usage	10. coloring agent
	Whether hazardous chemical substance is contained	[] Toxic substance [] Authorization substance [] Restricted substance [] Prohibited substance [] designated substance according to Article 10, Para graph 2, Item1 of K-REACH by MOE [] classified substance due to presence of physical risk[], health hazard[], environmental hazard[] accord ing to annex 7 of K-REACH		

※ In the case of trade secret under Article 2, Paragraph 2 of the Unfair Competition Prevention and Trade Secret Act, such as the relevant chemical substance's chemical composition and amount of the chemical substance contained, it's required to mark relevant information is trade secret

	Item	Description
Risk information	usage (identified usage in supply chain)	<ul style="list-style-type: none"> Industrial/expert/consumer usage : 10. Coloring agent - coloring agent mixed in plastic, paper, ink, paint or fabric in order to make color

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Manufacturing process(working environment)	hours and frequency of use	<ul style="list-style-type: none"> Annual used days : about 300 days (continuously• frequently)
	used amount per hour of task	<ul style="list-style-type: none"> Daily average usage amount : about 85,500 kg/day
	other working conditions related to relevant use	<ul style="list-style-type: none"> Non-dispersive use: non-dispersive exposure could be occurred in the process of raw material feeding, however worker work after they wear proper PPE for prevention of exposure and work in a place where scrubber and local ventilation equipment is placed in order to minimize exposure
measures to reduce risk	reduction measure regarding human exposure(including exposure rout)	<ul style="list-style-type: none"> Dermal, inhalation :when worker use registered substance, they wear PPE(working cloth, protection mask of which protection rate is 90% or more, industrial glove and protection glass)
	reduction measure regarding environmental exposure(including exposure rout)	<ul style="list-style-type: none"> Air: not applicable Water : not applicable Earth : not applicable Others : not applicable
	Waste management measures	<ul style="list-style-type: none"> Not applicable
exposure information and instruction for downstream user	estimated exposure under optimal working condition	<ul style="list-style-type: none"> No effectiveness level for worker Dermal : 9.62 mg/kg/day, inhalation : 0.04221mg/m3

Decree of the Ministry of Environment Under the Act on the Registration and Evaluation, Etc. of Chemical Substances [Annex No. 26]

Chemical Safety Information(Risk Information)

Provider	Company name: Chemours Korea Inc.	Business Reg. No.: 220-88-81323
	Name : Rim Young Kyu (Company Rep.)	Name of Person in charge and Contact no.: Kwack Woo Yong

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Date of first issue: 2017/04/21

Chemical information	(email : tyler.kwack@chemours.com)	
	Address : 12FL, Majestarcity Tower 1, 12, Seocho-daero 38-gil, Seocho-gu, Seoul, Korea (Business location)	
	Chemical name(generic name)	Titanium dioxide
	Identification No. (CAS No., etc.)	13463-667-7
Chemical information	Registration number(※ May be omitted for hazardous substance which is not registered)	04-2112-03750
	Trade name	
	Usage	20. fillers
	Whether hazardous chemical substance is contained	<input type="checkbox"/> Toxic substance <input type="checkbox"/> Authorization substance <input type="checkbox"/> Restricted substance <input type="checkbox"/> Prohibited substance <input type="checkbox"/> designated substance according to Article 10, Paragraph 2, Item1 of K-REACH by MOE <input type="checkbox"/> classified substance due to presence of physical risk[], health hazard[], environmental hazard[] according to annex 7 of K-REACH

※ In the case of trade secret under Article 2, Paragraph 2 of the Unfair Competition Prevention and Trade Secret Act, such as the relevant chemical substance's chemical composition and amount of the chemical substance contained, it's required to mark relevant information is trade secret

Risk information	Item		Description
	usage (identified usage in supply chain)		<ul style="list-style-type: none"> Industrial/expert/consumer usage : 20. fillers - fillers mixed in plastic, paper, paint or fabric in order to enhance performance of final product
	Manufacturing process(working environment)	hours and frequency of use	<ul style="list-style-type: none"> Annual used days : about 300 days (continuously• frequently)
		used amount per hour of task	<ul style="list-style-type: none"> Daily average usage amount : about 85,500 kg/day
		other working conditions related to relevant use	<ul style="list-style-type: none"> Non-dispersive use: non-dispersive exposure could be occurred in the process of raw material feeding, however worker work after they wear proper PPE for prevention of exposure and work in a place where scrubber and local ventilation equipment is placed in order to minimize exposure
	measures to	reduction measure	<ul style="list-style-type: none"> Dermal, inhalation :when worker use registered sub-

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	reduce risk	regarding human exposure(including exposure rout)	stance, they wear PPE(working cloth, protection mask of which protection rate is 90% or more, industrial glove and protection glass)
		reduction measure regarding environmental exposure(including exposure rout)	<ul style="list-style-type: none">• Air: not applicable• Water : not applicable• Earth : not applicable• Others : not applicable
		Waste management measures	<ul style="list-style-type: none">• Not applicable
	exposure information and instruction for downstream user	estimated exposure under optimal working condition	<ul style="list-style-type: none">• No effectiveness level for worker Dermal : 9.62 mg/kg/day, inhalation : 0.04221mg/m3