

TITANIUM DIOXIDE PIGMENT

1 IDENTIFICATION OF THE PRODUCT AND THE COMPANY

1.1 IDENTIFICATION OF THE SUBSTANCE / PREPARATION:

Material Identification Formula : TiO₂

1.2 IDENTIFICATION OF THE COMPANY:

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2 HAZARDOUS IDENTIFICATION

Component	CAS number	Percentage
TITANIUM DIOXIDE	13463-67-7	93% min
ALUMINA	21645-51-2	2~ 3 %
ZIRCONIA	112926-00-8	0.5 ~ 1.0%
ORGANIC WATER	7732-18-5	0.5 % max

Components (Remarks)

% Of COMPONENTS (other than water) ARE ON A DRY BASIS. For specific grade composition and properties see Titanium Dioxide Literature.

3 HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

3.2 POTENTIAL HEALTH EFFECTS Potential Effects of a Single Acute Exposure

Inhalation	: Dust may cause irritation of the respiratory tract, experienced as nasal discomfort and discharge.
Eye Contact	: Dust may cause discomfort in the eye and slight excess redness of the conjunctiva.
Skin Absorption	: No evidence or harmful effects from available information.
Swallowing	: No evidence of harmful effects from available information.

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Results of a Epidemiology study showed that employees who had been exposed to Titanium

Dioxide were at no greater risk of developing lung cancer than were employees who had been exposed to Titanium Dioxide. No Pulmonary Fibrosis was found in any of the employees and no association was observed between Titanium Dioxide exposure and chronic respiratory disease or x-ray abnormalities. Based on the results of this study Dongfang concludes that Titanium Dioxide will not cause lung cancer or chronic respiratory disease in humans at concentrations experienced in the workplace.

Inhalation of Amorphous Silica may cause drying of mucous membranes and irritation of nose, throat, and lungs with nosebleeds, cough, difficulty breathing or shortness of breath. Based on animal experiments, long term exposures to high doses could lead to pulmonary inflammation and subsequent development of chronic lung disease. Amorphous Silica does not include the lung effects associated with crystalline Silica.

Epidemiology studies have not shown any evidence of fibrosis in workers exposed to Amorphous Silica dust level ranging from 2 to 7 mg/ m³

Increased susceptibility to the effects of Amorphous Silica may be observed in persons with pre-existing disease of the lungs.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1 % are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

4 FIRST AID MEASURES

First Aid

INHALATION : If inhaled, removed to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT: The compound is not likely to be hazardous by skin contact but cleansing the skin after use is advisable.

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a Physician.

INGESTION : No specific intervention is indicated as compound is not likely to be hazardous by ingestion. However, if symptoms occur, consult a Physician.

5 FIRE FIGHTING MEASURES

Flammable Properties

Will not burn

Extinguishing Media

Any Media as appropriate for combustion in area.

Fire Fighting Instructions

None

6 ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (Personnel) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

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Accidental Release Measures

For dry product, shovel into covered container for disposal. Flush residue to waste water treatment system.

For slurry product, flush to waste water treatment plant or settling basin, or soak up with sand or other absorbent and shovel into covered metal container for disposal.

7 HANDLING AND STORAGE

7.1 Handling (Personnel)

In the manufacturer of Titanium Dioxide, product is packaged at temperatures of approximately 100 to 120 Centigrade (212 to 248 Fahrenheit). When pigment is shipped shortly after manufacture, it may stay hot for a very 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. Each work environment must be assessed to determine hazards..

The following caution is provided for grades packaged in plastic bags:

CAUTION: Plastic bag material may cause static ignition hazard in the presence of flammable or explosive vapor / air mixtures.

Do not handle or use bags in the presence of flammable or explosive vapor/air mixtures, For dry product avoid breathing dust.

If slurry product is allowed to dry, avoid breathing dust. Use dust filter respirator if exposure limits are exceeded (See Personal Protective Equipment)

* All other Titanium Dioxide grade packaged in paper or plastic bags should not be stacked more than three pallets high.

Protect containers of dry product from damage. Keep slurry product from freezing.

8 EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1 Engineering Controls

Good General ventilation should be provided to keep dust concentrations below the exposure limits.

8.2 Personal Protective Equipment

If exposure limits are exceeded for dust or dried-down product, NIOSH approved air purifying respirators equipped with particulate filters (properly fitted dust masks) should be used. Protective gloves should be worn to prevent prolonged skin contact with alkaline slurries. For dry product or dried down products use a protective barrier cream and/ or protective gloves to prevent skin contamination. Eye protection (minimum : safety glasses with side shields) is also required when handling Titanium Dioxide.

8.3 Exposure Guidelines

Applicable Exposure Limits

TITANIUM DIOXIDE

PEL (OSHA)	: 15 mg/ m ³ , total dust, 8 Hr TWA
TLV (ACGIH)	: 10 mg/ m ³ , total dust, 8Hr. TWA, A4
AEL	: 10 mg / m ³ , total dust, 8 Hr. TWA 5 mg/m ³ , respirable dust, 8 Hr. TWA

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AMORPHOUS SILICA

PEL (OSHA) : 80 mg/m³ / % SiO₂ - Hr TWA
TLV (ACGIH) : 10 mg/m³, total dust, 8 Hr. TWA
AEL : 3 mg/ m³, 8 Hr. TWA, respirable dust

AEL is acceptable exposure limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

9 PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Physical Data (dry product)

Boiling Point : Not Applicable
Vapor Pressure : Not Volatile
Vapor Density : Not Volatile
Melting Point : Not Applicable
Evaporation Rate : Not Volatile
Solubility in Water : Insoluble
pH : 4-10

(Water Extract)

Odor : None
Form : Powder, Solid
Color : White
Specific Gravity : 3.8 - 4.1

10 STABILITY AND REACTIVITY

Chemical Stability : Stable.
Incompatibility with Other Materials : None reasonably foreseeable
Decomposition : Decomposition will not occur.
Polymerization : Polymerization will not occur

11 TOXICOLOGICAL INFORMATION

Animal Data

Some (but not all) grades of Titanium Dioxide contain Amorphous Silica.

Titanium Dioxide

Oral ALD : > 24,000 mg/kg in rats
Dermal ALD : > 10,000 mg/ m³ in rabbits
inhalation 4-hour ALC : > 6.82 mg/L in rats

The product contains Titanium Dioxide which is a slight (HMIS scale) or moderate eye irritant and a slight skin irritant, but is not a skin sensitizer in animals.

This product may contain Amorphous Silica which is a mild eye irritant and is negligible to slight skin irritant when tested as a 50 % aqueous paste in animals. Amorphous Silica dust is not expected to be skin irritant. Animal testing indicates Amorphous Silica is not a skin sensitizer.

In short inhalation studies of Titanium Dioxide mixtures containing 6% Aluminum Hydroxide and 8% Silicon Dioxide, a slight fibrogenic response occurred in animals exposed to 1,300 mg/m³ for 4 weeks respirable dust.

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A typical dust cell reaction but no fibrogenic response was noted in animals similarly exposed to Titanium Dioxide, or Titanium Dioxide mixtures containing from 1% to 3% Aluminum Hydroxide, and 2.7 to 6 % Silicon Dioxide. Repeated inhalation exposure to Amorphous Silica caused Pulmonary changes including reversible inflammation. Long- term exposure caused pulmonary changes including reversible inflammation, vascular obstruction and emphysema. Guinea pigs exposed to Aluminum Hydroxide by inhalation exhibited no evidence of injurious effects but did show progressive accumulation of aluminum in the lungs.

Repeated and long- term ingestion of titanium Dioxide caused no significant toxicological effects. Single, repeated and long- term exposure by ingestion to Amorphous Silica caused no significant toxicological effects. Ingestion of Aluminum Hydroxide caused growth impairment, and bone changes due to phosphate depletion in animals but ingestion of Phosphate eliminates these changes ; no evidence of other toxicity was noted.

In lifetime animal feeding tests at levels up to 50,000 ppm, Titanium Dioxide showed no evidence of cancer or other significant adverse effects in either rats or mice. No animal data are available to define the developmental or reproductive toxicity of Titanium Dioxide. Tests have shown that Titanium Dioxide does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. Animal testing indicates Amorphous Silica does not have carcinogenic or reproductive effects. Amorphous Silica has not produced genetic damage in bacterial cultures.

12 ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity

96 hour LC50, fathead minnows : > 1,000 mg/L

13 DISPOSAL CONSIDERATIONS

Waste Disposal

Comply with federal, State and local regulations. If approved, removed to land disposal area.

14 TRANSPORTATION INFORMATION

Shipping Information

Not Regulated as a hazardous material by DOT, IMO, or IATA.

Shipping Containers:

Tank Cars

Tank Trucks

Flexible Intermediate Bulk Containers

Tote Bins

Bags

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