

MATERIAL SAFETY DATA SHEET

1. Product and company identification.

- Product Name: Titanium Dioxide
- Trade name: TiONA[®] is a trademark registered by Millennium Inorganic Chemicals, A Cristal Company.
- Products covered by this MSDS: TiONA[®] 188, TiONA[®] 568, TiONA[®] R-KB-2, TiONA[®] R-FK-D, TiONA[®] R-U-F, TiONA[®] 535, AT-1, TiONA[®] 595, TiONA[®] 596, TiONA[®] 696, TiONA[®] RCL-2, TiONA[®] RCL-3, TiONA[®] RCL-4, TiONA[®] RCL-6, TiONA[®] RCL-6T, TiONA[®] RCL-9, TiONA[®] RCL-722, TiONA[®] 90 and TiONA[®] RCL-168
- Company identification: Millennium Chemicals do Brasil S.A
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- Emergency telephones:
 - Products Information: +55 11 5185-9370
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2. Composition and information on ingredients

SUBSTANCE	CAS number	%
Titanium Dioxide	13463-67-7	80 - 99
Aluminum Hydroxide	21645-51-2	0 – 6 (as Al ₂ O ₃)
Amorphous Silica	7631-86-9	0 – 12 (as SiO ₂)

- The product also has a fractional percentage (about 0.5%) of organic additive.

Information on the specific composition of each product are available and can be requested through the "Products information" telephone or in the websites:

<http://www.millenniumchem.com> or <http://www.millennium-al.com.br>

3. Hazards identification

- Contact with eyes may cause irritation with lachrymation, pain or dim vision.
- Prolonged contact with the skin may cause irritation or cracking due to drying out of the skin and/or mechanical abrasion related to skin – clothes contact or skin – skin contact.
- The effects associated to the excessive exposition in a short period of time by breathing Titanium Dioxide may cause irritation to nose, throat and lungs, causing coughing, difficulties to breathe or panting.
- Under normal use and exposition conditions, toxicological and epidemiological studies for Titanium Dioxide did not show significant adverse effects to health.
- Listed by IARC as possibly carcinogenic to humans (Group 2B). This listing is based on inadequate evidence of carcinogenicity in humans and sufficient evidence in experimental animals.

4. First-aid measures

- Inhalation: move to the fresh air
- Eye contact: rinse with plenty of water. If the irritation persists, call for medical assistance.
- Skin contact: wash with soap and water
- Ingestion: the material is non toxic and does not hold in the intestinal tract, therefore no specific intervention is indicated.

5. Fire fighting measures

- Titanium Dioxide is not inflammable, therefore does not represent fire hazard.
- Packing materials (paper bags, plastic films and wooden pallets) are combustible. Fire in these materials shall be extinguished with water.

6. Accidental release measures

- Use any feasible mechanical measures (sweeping, suction) avoiding at maximum creating or spreading dust, and dispose it in appropriate containers.
- Prevent the product of getting into drains or channels, which may take it to natural water springs.

7. Handling and storage

- Handling: Minimize inhalation of dust and skin contact.
Product is supplied in pallets wrapped in plastic film. Removal of this plastic may generate static discharges; therefore, this operation shall not be performed in the presence of inflammable gases or vapors.
- Storage: Store in dry area. May form slippery surfaces when moist.
Maximum pile up: 03 (three) pallets

8. Exposure Control and Personal Protection

- Exposure Control: Good natural ventilation is enough in most of the circumstances. Exhaust or forced ventilation is necessary if the dust concentration in the environment approaches the limits of exposure.
- Respiratory Protection: Masks for dust or appropriate respiratory protective device may be used if the concentration of dust in the environment approximates or exceeds the occupational exposure limits.
- Hand Protection: Prolonged exposure must be avoided by the use of protective gloves. The particles of Titanium Dioxide may absorb moisture and natural oiliness of the skin, leaving it dry and more vulnerable.
- Eye protection: The use of safety goggles against dust is recommended if excessive concentrations of dust are likely to occur.
- Skin protection: People with sensitive skin may benefit from using protective cream and/or moisturizer.

- Occupational Exposure Limits:

COMPONENTS	OSHA (PEL)		ACGIH (TLV)	
	TWA	STEL	TWA	STEL
Titanium Dioxide	15* mg/m ³	n.e.	10* mg/m ³	n.e.
Silica, amorphous	80 mg/m ³ /%SiO ₂	n.e.	n.l.	n.e.
Aluminum Hydroxide	n.e.	n.e.	n.e.	n.e.

n.e. = not established

n.l. = not listed

* = total dust

9. Physical and Chemical Properties

Physical state:	solid (finely divided powder)
Boiling Point, 760 mm Hg:	Not applicable
Melting Point:	Approximately 1830 °C
Specific Gravity (H ₂ O=1):	3,7 - 4,20 g/cm ³
Vapor Pressure:	Not applicable
Vapor density (air=1):	Not applicable
Solubility in water:	Insoluble
Evaporation rate:	Not volatile
Appearance / odor:	Fine, white, odorless
pH (10% solution in water)	5,0 – 10,0

10. Stability and reactivity

- Stability – chemically stable and not reactive.
- Incompatibility with other materials – no one reasonably predictable.
- Decomposition – will not occur.

11. Toxicological Information

Titanium Dioxide: In lifetime inhalation studies of rats, airborne respirable-size titanium dioxide particles have been shown to cause lung tumors at concentrations associated with substantial particle lung burdens and consequential pulmonary overload and inflammation. However, other laboratory animals such as mice and hamsters did not develop lung tumors under similar testing with titanium dioxide. Furthermore, human epidemiology studies do not suggest an association between occupational exposure to titanium dioxide and risk for cancer.

12. Ecological Information

The available evidences indicate that Titanium Dioxide does not cause any significative adverse effect to the environment.

Titanium Dioxide is not bio accumulative.

The presence of Titanium Dioxide pigments in effluent liquid, even in low concentrations, will leave the spill very visible since the light is reflected by the dispersed particles.

Titanium Dioxide is inert, insoluble and is not biologically active.

13. Disposal and Treatment Considerations

The product is not considered hazardous residue according to UN (United Nations Organization). Please check state and local regulations for disposal of residues since they can be more restrictive.

(Note: The addition of chemicals, processing or change to this material, may turn the information for the management of the residue presented in this MSDS incomplete, inaccurate or improper.)



Millennium
Inorganic Chemicals
A Cristal Company

Product Name: Titanium Dioxide
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14. Transport Information

Titanium Dioxide and Millennium pigments are not listed as harmful or hazardous products. There are not special requirements in national or international regulations regarding sea, road, railroad or air transportation.

15. Regulatory Information

OSHA STATUS: These Products contain components that have been assigned an OSHA PEL and/or ACGIH TLV and, therefore, are considered hazardous under the criteria of the U.S. Federal OSHA Hazard Communication Standard §29 CFR 1910.1200

U.S. TSCA INVENTORY STATUS: All components are listed.

CANADIAN DSL STATUS: All components are listed.

EUROPEAN EINECS STATUS: All components are listed.

AUSTRALIAN AICS STATUS: All components are listed.

JAPANESE MITI STATUS: All components are listed.

CERCLA REPORTABLE QUANTITY (RQ): None.

SARA TITLE III:

Section 302/304 - No Extremely Hazardous Substances.

Section 311/312 - Reporting requirements are applicable for components in Section 2 of this MSDS.

Section 313 - No section 313 chemicals.

NOTE: Consult state and local regulations which may also apply.

OZONE DEPLETING SUBSTANCES: None

VOLATILE ORGANIC COMPOUNDS: None

HAZARDOUS AIR POLLUTANTS or EXTREMELY HAZARDOUS AIR POLLUTANTS:
None

CALIFORNIA "PROPOSITION 65" CHEMICALS: None

CONEG: The sum of the concentration levels of lead, cadmium, mercury and hexavalent chromium present in the products do not exceed one hundred (100) parts per million (ppm) by weight, on a dried-weight basis.

16. Other Information**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS):**

Health Hazard - *1

Flammability Hazard - 0

Reactivity Hazard - 0

Personal Protection - E

Note: This rating will generally suffice for normal operating conditions. Please note however, that the type of personal protection utilized may change based on specific use conditions. Consult the Exposure Controls/Personal Protection section of this MSDS.

- This MSDS replaces the Version 5.1 of 21.05.2007.

Reason: Update product name from TiONA[®] RCL-188 to TiONA[®] 188 and the job position of the Responsible Chemist.

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NOTES:

The information contained in this MSDS is respect exclusively to this product.

They may not be valid for this product if used in combination to any other material.