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مدیریت محیط زیست

MATERIAL SAFETY DATA SHEET

TITANIUM DIOXIDE, SOLID

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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WHMIS#: 00060859
Index: GCD3174/16A
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EMERGENCY TELEPHONE NUMBER (For Emergencies Involving Chemical Spills or Releases)

1 855 273 6824

PRODUCT IDENTIFICATION

Product Name:	Titanium Dioxide, Solid.
Chemical Name:	Titanium Dioxide.
Synonyms:	Titanic Acid Anhydride; C.I. Pigment White 6; C.I. 77891; Titania; Titanium (IV) Oxide; Titanium Peroxide; Titanium White. Trade names include: BSI Titanium Dioxide 323 ; BSI Titanium Dioxide 325 ; BSI Titanium Dioxide 3328 ; BSI Titanium Dioxide 3330 ; BSI Titanium Dioxide 3333 ; Kemox RC 808 ; Kemox RC 822. Kronos 1000 ; Kronos 2020 ; Kronos 2044 ; Kronos 2047 ; Kronos 2063 ; Kronos 2064 ; Kronos 2073 ; Kronos 2090 ; Kronos 2101 ; Kronos 2160 ; Kronos 2190; Kronos 2210 ; Kronos 2211 ; Kronos 2220 ; Kronos 2230 ; Kronos 2300 ; Kronos 2310.
Chemical Family:	Inorganic Oxide.
Molecular Formula:	TiO2.
Product Use:	Pigmentation. Chemical intermediate.

WHMIS Classification / Symbol:

D-2A: Very Toxic (carcinogen)

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Ingredient	*CAS#*	*ACGIH TLV (TWA)*	*% Concentration*
Titanium Dioxide (TiO2)	13463-67-7	10 mg/m³ *A4	80 - 100
Some grades may contain:			
Aluminum Hydroxide	21645-51-2	---	0 - 5
Silica gel	112926-00-8	---	0 - 10

A4 = Not classifiable as a human carcinogen. (ACGIH-A4).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:	Suspect cancer hazard. Dust may cause mechanical irritation to skin, eyes and respiratory tract. May cause pulmonary fibrosis and pneumoconiosis. Can decompose at high temperatures forming toxic gases. See "Other Health Effects" Section.
POTENTIAL HEALTH EFFECTS	
Inhalation:	Product may be mildly irritating to the nose, throat and respiratory tract and may cause coughing and sneezing. Excessive contact with powder may cause drying of mucous membranes of nose and throat due to absorption of moisture and oils. See "Other Health Effects" Section.
Skin Contact:	This product may cause irritation due to abrasive action. Excessive contact with powder may cause drying of the skin due to absorption of moisture and oils. Avoid handling when the skin is moist, wet or abraded.
Skin Absorption:	Not likely to be absorbed through the skin.
Eye Contact:	This product may cause irritation, redness and possible damage due to abrasiveness. Excessive contact with powder may cause drying of mucous membranes of the eyes due to absorption of moisture and oils.
Ingestion:	This product may cause mild gastrointestinal discomfort. Ingestion of large amounts may cause nausea, gastrointestinal upset and abdominal pain.
Other Health Effects:	Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. May cause shortness of breath, lung damage, pulmonary fibrosis and pneumoconiosis. Pneumoconiosis is the deposition of dust in the lungs and the tissue's reaction to its presence. When exposure to the dust is severe or prolonged, the lungs' defenses are overwhelmed. Titanium dioxide dust is considered possibly carcinogenic to humans based on animal evidence, which shows that high concentrations of pigment-grade (powdered) and ultrafine titanium dioxide dust causes respiratory tract cancer in rats exposed by inhalation and intratracheal instillation. (4) See Section 11, "Other Studies Relevant to Material".

4. FIRST AID MEASURES

FIRST AID PROCEDURES	
Inhalation:	If respiratory problems arise, move the victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical advice IMMEDIATELY.
Skin Contact:	Start flushing while removing contaminated clothing. Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, repeat flushing and obtain medical attention.
Eye Contact:	Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. Take care not to rinse contaminated water into the unaffected eye or onto the face. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. DO NOT induce vomiting. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. Obtain medical attention IMMEDIATELY.
Note to Physicians:	Treat symptomatically. Medical conditions that may be aggravated by exposure to this product include diseases of the skin, eyes or respiratory tract.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	***AutoIgnition Temperature (°C)***	**Flammability Limits in Air (%):** ***LEL***	***UEL***
Non-combustible (does not burn).	Not applicable.	Not applicable.	Not applicable.

Flammability Class (WHMIS):	Not regulated.
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include oxides of silicon and oxides of titanium.

Unusual Fire or Explosion Hazards:	Minimize air borne spreading of dust. Spilled material may cause floors and contact surfaces to become slippery.
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	Not expected to be sensitive to static discharge.

EXTINGUISHING MEDIA

Fire Extinguishing Media:	Foam. Dry chemical, carbon dioxide or water spray.

FIRE FIGHTING INSTRUCTIONS

Instructions to the Fire Fighters:	Use water spray to cool fire-exposed containers or structures. Use water spray to disperse vapours. Spilled material may cause floors and contact surfaces to become slippery.
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures:	In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Minimize air borne spreading of dust. Wear respirator, protective clothing and gloves. Avoid dry sweeping. Do not use compressed air to clean surfaces. Vacuuming is preferred. Do not allow to enter sewers or watercourses. Collect product and contaminated soil for re-use or disposal. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment. Where a package (drum or bag) is damaged and / or leaking, repair it, or place it into an over-pack drum immediately so as to avoid or minimize material loss and contamination of surrounding environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices:	Use normal "good" industrial hygiene and housekeeping practices. Minimize air borne spreading of dust. Clean up immediately to eliminate slipping hazard.
Ventilation Requirements:	See Section 8, "Engineering Controls".
Other Precautions:	Use only with adequate ventilation and avoid breathing dusts. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Titanium dioxide product may be packaged at temperatures of approximately 100 to 120 °C and stay hot for a long time depending on ambient temperatures and inventory storage practices. (3)

STORAGE

Storage Temperature (°C):	See below.
Ventilation Requirements:	General exhaust is acceptable. Local exhaust ventilation preferred.
Storage Requirements:	Store in a cool, dry and well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Avoid moisture contamination. Prolonged storage may result in lumping or caking.
Special Materials to be Used for Packaging or Containers:	Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls:	Local exhaust ventilation required. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense dust may collect.
PERSONAL PROTECTIVE EQUIPMENT (PPE)	
Eye Protection:	Safety glasses with side shields are recommended to prevent eye contact. Use chemical safety goggles when there is potential for eye contact. Contact lenses should not be worn when working with this material.
Skin Protection:	Gloves and protective clothing made from cotton, canvas or rubber should be impervious under conditions of use. Prior to use, user should confirm impermeability. Discard contaminated gloves.
Respiratory Protection:	No specific guidelines available. A NIOSH/MSHA-approved air-purifying respirator equipped with dust, mist, fume cartridges for concentrations up to 100 mg/m³. An air-supplied respirator if concentrations are higher or unknown.
Other Personal Protective Equipment:	Wear regular work clothing. The use of coveralls is recommended. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

EXPOSURE GUIDELINES

SUBSTANCE	***ACGIH TLV***	***OSHA PEL***		***NIOSH REL***	
	(STEL)	***(TWA)***	***(STEL)***	***(TWA)***	***(STEL)***
Titanium Dioxide (TiO2)	—	15 mg/m³ (Total Dust)	---	---	---

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Solid.
Appearance:	Dry, white granules: fine sized, beads, pucks, or powder.
Odour:	Odourless.
Odour Threshold (ppm):	Not applicable.
Boiling Range (°C):	Not available.
Melting/Freezing Point (°C):	> 1000.
Vapour Pressure (mm Hg at 20° C):	Not applicable.
Vapour Density (Air = 1.0):	Not applicable.
Relative Density (g/cc):	3.7 - 4.2.
Bulk Density:	Not available.
Viscosity:	Not applicable.
Evaporation Rate (Butyl Acetate = 1.0):	Not applicable.
Solubility:	Not soluble in water.
% Volatile by Volume:	Not available.
pH:	8 - 10.5 (slurry).
Coefficient of Water/Oil Distribution:	Not available.
Volatile Organic Compounds (VOC):	Not applicable.
Flashpoint (°C):	Non-combustible (does not burn).

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions:	Stable.
Under Fire Conditions:	Not flammable.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition. Minimize air borne spreading of dust. Clean up immediately to eliminate slipping hazard. Combines with most metallic oxides at elevated temperatures to form "glass".

Materials to Avoid:	Lewis or mineral acids. Metals (e.g. aluminum powder, lithium, magnesium and zinc) - reduction of titanium dioxide on heating is accompanied by incandescence and temperature rise; the reactions are violently exothermic and rapid. (4) Potassium perchlorate, Aluminum powder and Titanium dioxide - A mixture of the 3 compounds exploded violently during mixing. The mixture has also been accidentally ignited by a spark. (4)
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include oxides of silicon and oxides of titanium.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	***LD50 (Oral, Rat)***	***LD50 (Dermal, Rabbit)***	***LC50 (Inhalation, Rat, 4h)***
Titanium Dioxide (TiO2)	> 25 000 mg/kg (4)	> 10 000 mg/kg (4)	> 6820 mg/m3 (4)

Carcinogenicity Data:	Titanium Dioxide: Possibly carcinogenic to humans. (IARC-2B)
Reproductive Data:	No adverse reproductive effects are anticipated.
Mutagenicity Data:	No adverse mutagenic effects are anticipated.
Teratogenicity Data:	No adverse teratogenic effects are anticipated.
Respiratory / Skin Sensitization Data:	None known.
Synergistic Materials:	None known.
Other Studies Relevant to Material:	The International Agency for Research on Cancer (IARC) has determined that titanium dioxide is possibly carcinogenic to humans (Group 2B) based on inadequate evidence in humans and sufficient evidence in experimental animals. This conclusion relates to long-term inhalation exposure to high concentrations of pigmentary (powdered) or ultrafine titanium dioxide. Long-term inhalation of high concentrations of titanium dioxide dust has caused lung tumours in rats but not in hamsters or mice. The tumours are believed to be related to the inflammation resulting from dust overloading of the lungs. Ultrafine titanium dioxide has increased the incidence of lung tumours at much lower exposure concentrations than are required with the larger sized pigment grade particles. The effects are more closely related to lung burden in terms of the surface area rather than the mass of the particles. (4) Female rats were exposed whole-body to filtered air or to an aerosol of ultrafine titanium dioxide (primary particle size, 15-40 nm; MMAD of aerosol particles: 0.80 micrometres) for up to 2 years (18 hr/d, 5 d/wk). The concentrations of titanium dioxide used were 7.2 mg/m3 for the first 4 months, 14.8 mg/m3 for the next four months and 9.4 mg/m3 for the remaining 16 months. There was a significant decrease in survival, body weight and lung clearance and a significant increase in lung weight of exposed rats. The number of rats with lung tumours was 32/100 compared to 1/217 for unexposed controls. Female mice similarly exposed for 13.5 months had no increase in lung tumours. Tumours in the airways and lungs were observed in rats following inhalation of 250 mg/m3 titanium dioxide dust (MMAD of aerosol particles: 1.5-1.7 micrometres; 84% respirable) for 2 years (6 hr/d, 5 d/wk). (4)

12. ECOLOGICAL INFORMATION

Ecotoxicity:	Not available. Low acute toxicity to aquatic organisms.
Environmental Fate:	Not available. May be harmful if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	None required.
Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.

Safe Handling of Residues: See "Waste Disposal Methods".

Disposal of Packaging: Empty containers retain product residue. Treat package in the same manner as the product.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

This product is not regulated by TDG.

Label(s): Not applicable. Placard: Not applicable.

ERAP Index: -----. Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

This product is not regulated by DOT.

Label(s): Not applicable. Placard: Not applicable.

CERCLA-RQ: Not available. Exemptions: None known.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: All components of this product are included on the DSL.

CEPA - NPRI: Titanium (and its compounds).

Controlled Products Regulations Classification (WHMIS):

D-2A: Very Toxic (carcinogen)

USA

Environmental Protection Act: All components of this product are included on the TSCA inventory.

OSHA HCS (29CFR 1910.1200): Carcinogenic.

NFPA: Health, Fire, Reactivity (Not available.)

HMIS: 2 Health, 0 Fire, 0 Reactivity (6)

INTERNATIONAL

Titanium Dioxide is found on the following inventories: EINECS (European Inventory of Existing Commercial Chemical Substances), Australia (ACOIN), Japan (MITI) and Korea (ECL).

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO chemical profile, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2011, American Conference of Governmental Industrial Hygienists, Cincinnati, 2011.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.
8. Lewis, Sr., Richard J., Carcinogenically Active Chemicals, Van Nostrand Reinhold, 1991, ISBN 0-442-31875-8.

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

This Material Safety Data Sheet is valid for three years.

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