MATERIAL SAFETY DATA SHEET

ACCORDING TO REGULATION (EC) NO 1907/2006

Name Of Item	CAS No.	KE No.	EU No.
TITANIUM DIOXIDE	13463-67-7	KE-33900	236-675-5

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

A. Name of Item	COTIOX Titanium Dioxide (all types)
B. Recommended use of Item and relevant	
- Recommended use of Item	White pigment for, paints, coatings, printing inks, plastics, paper etc.
- Uses advised against	Not classified
C. Information about Manufacturer	
- Name	[COSMO CHEMICAL CO., LTD.]
- Address	[Head Officd/Onsan Plant] 55, Wonbong-ro, Onsan-eup, Ulju-gun, Ulsan, Korea
- Contact Number	[Head Office] ☎ 052-231-6700 FAX: 052-231-6823 [Onsan Plant] ☎ 052-231-6715 FAX: 052-237-2104

2. HAZARDS IDENTIFICATION

A. Classification of Hazards	Titanium dioxide according to Regulation (EC) No 1272/2008 Directive 67/548/EWG and the Globally Hamonized System(GHS) is not classified as dangerous material
Human Health effects	
- Skin effect	Skin is not penetrated, but prolonged contact can cause irritation
- Eye effect	Feeling of a strange body in the eyes
- Swallowing	No hazard during normal industrial use
- Inhalation	Chemically neutral dust. Excessive exposure may cause temporary drying effect and/or irritation of mucous membranes
B. Label elements	According to Regulation (EC) No 1272/2008 and GHS titanim dioxide is
C. Other hazards	Neither a PBT nor a vPvB substance

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	EC No.(EINECS)	Concentration (%)
Titanium dioxide	13463-67-7	236-675-5	90 ~ 100

4. FIRST-AID MEASURES

A. General information	No special measures required
B. Inhalation	Remove person to fresh air, consult doctor in case of symptoms
C. Skin contact	Wash with water and soap
D. Eye contact	Rinse with plenty of water
E. Swallowing	If worrying about exposure, get medical advice
F. Most important symptoms/effects, acute and delayed	No further relevant information available
G. Indication of any immediate medical attention and special treatment needed	No further relevant information available

5. FIREFIGHTING MEASURES

A. Approptiate(Inappropriate) extinguisher	Not applicable
B. Maleficence by the material	Not applicable
C. Precautions and safey suit when extingusing fire	If it is not dangerous, move the container away from fire Avoid to inhale the material as it is Stand by the side the wind blows and avoid the lower place

6. GUIDE-LINE WHEN EXPOSURE OCCURS

A. Devices and precautions to protect body	Avoid inhalation of powder, hume, gas, steam and spray
B. Precautions to protect environment	Not applicable
C. How to purify and remove the pollution	Use any feasible means without dusting. After cleaing, flush away traces with water

7. HOW TO HANDLE AND STORE

A. Safety guideline	Avoid breathing dust and wash thoroughly often handing Provide local exhaust at points of dust escape
B. How to do safe storage	Keep distance from heat, spark, flame and high temperature Store under dry conditions and well-ventilated place, Keep sealed

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Occupational Exposure Limits	No value assigned for this specific material by the National Occupational health and Safety commision. However, Exposure standard(s) for constituent(s):
ACGIH regulation	10 mg/m3 TWA
OSHA regulation	15 mg/m3 (total dust, 8hr TWA)
Biological terms of exposure	Not applicable
B. Proper engineered management	Take the engineered management using local ventilation or manipulation the level of air under the exposure term Take ventilation to keep polluted air under the air exposure level Build the cleaning facility and safety shower booth where storing this material
C. Personal protection equipment	
Industrial hygiene measures	Keep in clean
Respitarory protection	Wear mask authorized
Hand protection	Prolonged exposure should be avoided by wearing suitable protective gloves
Eye protection	Wear protective goggles
Skin and body protection	Prolonged exposure should be avoided by wearing suitable protective clothes

9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	
- Substance	Inorganic substance
- Physical state	Powder,crystalline,white, odorless
B. Relative vapour density (air=1)	Not applicable
C. Vapour pressure (20°C)	Not applicable

D. pH	6.0 - 8.0
E. Flash point (°C)	Not applicable
F. Boiling point (at 1013 hPa)	2500 ~ 3000℃
G. Density (Relative density)	3.4 ~ 4.3
H. Surface tension	Not applicable
I. Partition coefficient n-octanol/water	Not applicable
J. Explosive properties	No explosive properties
K. Self-ignition temperature	Not auto-ignite at temperature melting
L. Oxidising properties	No oxidizing properties
M. Stability in organic solvents and identity of relevant degradation products	Not applicable
N. Viscosity	Not applicable

10. STABILITY AND REACTIVITY

A. Reactivity	Non Reactive
B. Chemical stability	Stable
C. Possibility of hazardus reactions	None
D. Conditions to avoid	None
E. Incompatible materials	None known
D. Hazardous decomposition products	Unknown

11. TOXICOLOGICAL INFORMATION

A. Acute toxicity	
Oral	LD50 > 5000 ㎎/㎏ (rat)
Inhalation	LC50/4hr > 6.82 ㎎/ℓ (rat)
B. Irritation/Corrosivity	
Skin	Not irritating (rabbit)
Eye	Not irritating (rabbit)
C. Respiratory or skin sensitisation	No sensitizing effects
D. Mutagenicity	Genetic toxicity : negative
E. Carcinogenicity	IARC has characterized titanium dioxide as pertaining to Group 2B (possibly carcinogenic to humans), but either NTP or OSHA has not characterized titanium doixide as a potential carcinogen Detailed epidemiological studies have shown no causative link between titanium dioxide exposure and cancer risk in humans
F. Toxicity for reproduction	Based on the weight of evidence from the available long-term toxicity/ carcinogenicity studies in rodents and the relevant information on the

	toxicokinetic behavior in rats it is rats it is concluded that TiO2 does not present a reproductive toxicity hazard.

12. ECOLOGICAL INFORMATION

A. Biological toxicity	
- Fish	Pimphales promelas LC50(96hr) > 1000 ㎎/ℓ
- Aquatic plants	Pseudokirchneriella subcapitata EC50(72hr) > 61 ㎎/ℓ
- Aquatic invertebrates	Daphnia magna LC50(48hr) > 100 ㎎/ℓ
B. Persistence and resolvability	
- Persistence	None
- Resolvability	None
C. Biological concentration	
- Concentration	None
- Resolvability	None
D. Soil movement	None
E. Other toxicity	None

13. DISPOSAL CONSIDERATIONS

A. Waste treatment methods	Remove the waste according to environmental regulations Not classified as hazadous waste

14. TRANSPORTATION INFORMATION

A. UN NO.	Not applicable
B. UN proper shipping name	Not applicable
C. Transport hazard class(es)	Not applicable
D. Packing group	Not applicable
E. Environmental hazards	Not applicable
F. Special precautions for user	Not applicable

15. REGULATORY INFORMATION

A. Safety, health and environmental regulations/legislation specific for the substance	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18th December 2006 council of 18th December 2006 concerning Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a Euopean Chemicals Agency amending Directive 1999/45/EC and relealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EEC and 2000/21/EC. Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labeling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

16. OTHER INFORMATION

	International Agency for Research on Cancer (IARC) has classified titanium dioxide in to Group 2B "Possibly carcinogenic to humans". This classification is

	based on the IARC rules which state: there is "Sufficient evidence of carcinogenicity: …if… two or more independent studies in one species of animals carried out at different times or in different laboratories or under different laboratories or under different protocols" show evidence of tumors. The IARC expert group judged three studies on rats as qualifying. However there is no evedence that titanium dioxide itself has toxic properties that would lead to cancer,nor that it presents a carcinogenic risk to humans at exposures experienced in the workplace.
A. Date of first preparation	2014/10/29
B. Revision Date	2017/11/08
C. Version(Amending number)	5(four)