SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier

Product name: TIPAQUE PFR209
Chemical name: Titanium Dioxide
CAS No.: 13463-67-7

Relevant identified uses of the substance or mixture

Product use: Pigment

Details of the supplier of the safety data sheet

Manufacturer:	Company Name:	ISHIHARA SANGYO KAISHA, LTD.
	Address:	3-15 EDOBORI, 1-CHOME, NISHI-KU, OSAKA, 550-0002 JAPAN
	Phone Number:	+81-6-6444-1451
	Fax number:	+81-6-6445-7798
Distributor:	Company Name:	ISHIHARA CORPORATION (U.S.A)
	Address:	601 CALIFORNIA ST. ,STE 1700 SAN FRANCISCO. CA 94108
	Phone Number:	(415) 421-8207

Emergency phone number:

CHEMTREC
United States: (800)424-9300 24 hours Everyday
International: +1-(703)527-3887(Collect) 24 hours Everyday
Emergency number for US BOUND shipments ONLY
Chemtrec's coverage applies only to US inbound & outbound shipments.

2.HAZARDS IDENTIFICATION

Classification of the substance or mixture

The Hazard Communication Standard (HCS) (29 CFR 1910. 1200)
No classification

Label elements

The Hazard Communication Standard (HCS) (29 CFR 1910. 1200)
No signal word, hazard symbol or hazard statement

Hazard not otherwise classified(HNOC)

No classification

Other hazards

Inhalation: May cause nose, throat, and lung irritation.
Skin: Contact with dust can cause mechanical irritation or drying of the skin.
Eyes: Dust contact with the eyes can lead to mechanical irritation.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Chemical identity.

Substance or mixture: Mixture
Common chemical names or synonyms: Titanium dioxide
Titanium(IV) oxide
C.I. Pigment White 6

Component	Formula	CAS No.	EINECS No.	Concentration
Titanium Dioxide	TiO_2	13463-67-7	236-675-5	≥80%
Aluminum Hydroxide	$Al(OH)_3$	21645-51-2	244-492-7	<10%
Amorphous Silica	SiO_2	7631-86-9	231-545-4	<10%
Zinc Oxide	ZnO	1314-13-2	215-222-5	＜1%

All impurities and stabilizing additives which contribute to the classification of substance: None

4. FIRST-AID MEASURES

Description of necessary first-aid measures

Inhalation: Move to a fresh air atmosphere.
In case of persistent symptoms, consult a doctor.
Skin contact: Wash with soap and water.
Eye contact: Rinse immediately with plenty of water.
If irritation persists, seek medical attention.
Ingestion: No adverse health effects anticipated by this route; however, in the event of ingestion, increase intake of liquid in order to flush from the body. In case of persistent symptoms, consult a doctor.

Most important symptoms and effects, both acute and delayed

Symptoms: Irritant effects[1)]

5. FIRE-FIGHTING MEASURES

Extinguishing media

Use extinguishing media suitable for surrounding fire.
This product is not combustible.

Specific hazards arising from the substance or mixture

Product is inert, non-flammable and incombustible.

Advice for fire-fighters

Use protective measures that suit the hazard condition.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Avoid generating dust. Ensure adequate ventilation.
Wear personal protective equipment.

Environmental precautions

Prevent run-off from entering ground, storm sewers and ditches which lead to natural waterways.

Methods and material for containment and cleaning up

Use any feasible mechanical means (e.g. vacuum, sweeping) but avoid dusting during clean-up. The product can cause slippery conditions if wet. Even at low concentration, the product renders the discharge in liquid effluent highly visible.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling:	Avoid raising and breathing dust. Observe good industrial hygiene practice for chemical handling.
Technical measures:	Avoid raising dust. Handling systems and areas should be operated in such a way as to minimize exposure to dust.
Precautions:	Local exhaust ventilation may be necessary. Minimize dust during handling. Take precautionary measures against static discharge.
Advice on usage:	Manual handling guidelines should be adhered to when handling sacks.

Conditions for safe storage, including any incompatibilities

Storage conditions:	Pigments should not be stored in outside areas exposed to the weather. Care should be taken to avoid exposure to moisture.
Incompatible materials:	See Section 10.
Packing material:	Paper, Plastic.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Control parameters

Exposure limits

Chemical name		ACGIH	OSHA(PEL)	NIOSH(REL)
Titanium Dioxide	TWA	10mg/m^3	5mg/m^3 (respirable dust) 15mg/m^3 (total dust)	2.4 mg/m^3 (Fine)
	STEL	-	-	-
Amorphous Silica	TWA	10mg/m^3	80 mg/m^3/(%SiO_2)	6 mg/m^3
	STEL	-	-	-

Chemical name		ACGIH	OSHA(PEL)	NIOSH(REL)
Zinc Oxide	TWA	2mg/m^3	5mg/m^3 (respirable dust) 15mg/m^3 (total dust)	5mg/m^3
	STEL	10mg/m^3	-	15mg/m^3

Exposure controls

Technical measures

Ensure sufficient ventilation.

Reduce inhalation hazards in minimizing occupational exposure.

Engineering controls and safe systems of work should be used in preference to Personal Protective Equipment (PPE) to minimize the risk of exposure.

Personal protective equipment:

Respiratory protection: A respirator must be used if the dust concentration is likely to exceed the occupational exposure limit. An approved dust respirator is recommended as appropriate depending on dust levels and other workplace factors.

Eye protection: The use of dustproof goggles or glasses with side protections is recommended if dust concentrations are likely to exceed the occupational exposure limit.

Skin protection: Respect main rules concerning protective clothing for chemical handling.

Hand protection: Prolonged exposure should be avoided by wearing suitable impervious protective gloves.

Hygiene measures: Individuals having sensitive skin may find it beneficial to use a barrier cream or moisturizer when excessive or prolonged contact with the skin is likely.

Environmental exposure controls:

Do not allow material to contaminate ground water system.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance(Physical state, color, etc.):	White powder[1)]
Odor:	None
Odor threshold:	No data available.
pH:	Indicate neutral pH (litmus) when suspended in water (1:10). [2)]
Melting point/ freezing point:	1820 - 1850°C
Initial boiling point and boiling range:	2500 - 3000°C[1)]
Flash Point:	Incombustible[3)]
Evaporation rate (butyl acetate = 1):	Not applicable.
Flammability (solid, gas):	Incombustible[3)]
Upper/lower flammability or explosive limits:	Incombustible[3)]
Vapor pressure:	No data available.
Vapor density (air=1):	No data available.
Specific gravity:	3.5-4.2
Solubility(ies):	Insoluble in water, and organic solvents. Soluble in hot concentrated sulfuric acid.
Partition coefficient; n-octanol/water:	No data available.

Auto ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	Not applicable.

10. STABILTY AND REACTIVITY

Reactivity:	None known.
Chemical Stability:	Stable under normal conditions.
Possibility of hazardous reactions:	None known.
Conditions to avoid:	Avoid dust formation.
Incompatible materials:	None known.
Hazardous decomposition products:	None known.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

TiO_2	Oral:	Not classified.	LD_{50} > 12000mg/kg in rats[4),5)]
	Dermal:	Not classified.	LD_{50} > 10000mg/kg in rabbits[3)]
	Inhalation (Dust):	Not classified.	LC_{50} > 6.82mg/L/4h in rats[3)]
SiO_2 (Amorphous)	Oral:	Not classified.	LD_{50} = 3160mg/kg [6)]

Skin corrosion/ Irritation: Not classified.

Very slight irritation to the skin could occur. [3)]

Not classified. (TiO_2)

Serious eye damage/ eye irritation: Not classified.

Mild irritation in rabbits.[3)] However, this effect was fully reversible after 24hour and there were no corneal lesions, the iris was not affected, and there were no systemic intolerance reactions.[7)]

Not classified. (TiO_2)

Respiratory/ Skin sensitization: Not classified.

Gross overexposure by inhalation may include mild and temporary upper respiratory irritation. Negative in human by patch test.[3)]

Not classified. (TiO_2)

Germ cell mutagenicity: Not classified.

Negative in mouse test for chromosomal abnormalities.[8)] Negative in Ames test.[3)]

Not classified. (TiO_2)

Carcinogenicity: Classification is not possible.

IARC: Group 2B (Possibly carcinogenic to humans) [9)]

In lifetime inhalation studies of rats, mice and hamsters, only in rats, lung tumors were found to occur when the particles of TiO_2 were overloaded. In further studies of rats, other poorly soluble low-toxicity particles such as silica and carbon black also induced lung tumors. These findings indicate that the formation of lung tumors in rats could be species specific.[10),11)] In addition, several epidemiological studies in Europe and the USA suggested that TiO_2 dust did not show any relationship to carcinogenic effects on the lung.[2),12),13),14)]

Classification not possible. (TiO_2)

IARC: IARC: Group 3 (Not classifiable as to its carcinogenicity to humans) [15]
Classification is not possible. (SiO_2 (Amorphous))

Reproductive toxicity: Classification not possible.
No data available.

Specific target organ toxicity (single exposure): Classification not possible.
No toxicologically significant effects were found at the guidance value in oral studies of rats.[4),5)] However, the effects by other routes is not clear.
Classification not possible. (TiO_2)

Specific target organ toxicity (repeated exposure): Classification not possible.
No toxicologically significant effects were found at the guidance value in oral studies on rats and mice.[16)] In addition, no toxicologically significant effects were found at the guidance value in two-year inhalation studies on rats.[3)]
A small number of workers who were exposed over a period of 20 years showed pneumoconiosis on their X-rays.[17)]
However, human epidemiological studies do not suggest an association between exposure to titanium dioxide and a risk of pulmonary fibrosis. [12), 13), 17), 18)]
Classification not possible. (TiO_2)

Aspiration hazard: Classification not possible.
No data available.

12. ECOLOGICAL INFORMATION

Toxicity

Acute aquatic toxicity: Not classified.
Daphnia magna EC_{50} > 1000mg/L (48 hr)[19)]
Insoluble in water. [2)]
Not classified. (TiO_2)

Chronic aquatic toxicity: Classification not possible.
Acute aquatic toxicity was not found.
Classification not possible. (TiO_2)

Persistence and degradability

Titanium dioxide is persistence and does not biodegrade.

Bioaccumulative potential

TiO_2 is not considered to be bioaccumulative.[7)]

Mobility in soil

No data available.

Hazardous to the ozone layer

The components of this product are not listed in Annexes to the Montreal Protocol.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Product:

Dispose of in compliance with local and national regulations.

Contaminated packing:

Contaminated packages are not considered hazardous.
If recycling is not practicable, dispose of in compliance with local regulations.

14. TRANSPORT INFORMATION

UN No.:	Not applicable.
UN proper shipping name:	Not applicable.
Transport hazard class:	Not applicable.
Packing group:	Not applicable.
Environmental hazards:	No
Transport in bulk (MARPOL 73/78):	Not applicable.

Not regulated for transport by DOT, IMO/IMDG, IATA/ICAO,ADR/RID.

Do not pile up high to avoid falling and loosening.
Product should be prevented from falling, loosening or tumbling during transport.
Avoid direct sunlight.

15. REGULATORY INFORMATION

Safety, health and environmental regulation/legislation specific for the substance or mixture

Comply with governmental and local regulations.

Country(ies) or Region	Inventory Name	Components (CAS No.)			
		TiO_2 (13463-67-7)	$Al(OH)_3$ (21645-51-2)	SiO_2 (Amorphous) (7631-86-9)	ZnO (1314-13-2)
EU	EINECS	Yes	Yes	Yes	Yes
Australia	AICS	Yes	Yes	Yes	Yes
Canada	DSL	Yes	Yes	Yes	Yes
Japan	ENCS	Yes	Yes	Yes	Yes
Korea	KECI	Yes	Yes	Yes	Yes
Philippines	PICCS	Yes	Yes	Yes	Yes
China	IECSC	Yes	Yes	Yes	Yes
USA	TSCA	Yes	Yes	Yes	Yes
Taiwan	CSNN	Yes	Yes	Yes	Yes

OSHA: This product is a “Hazardous Chemical” as defined by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

TSCA 12(b) Export Notification: No ingredients listed.

SARA Title III Section 313: This material contains toxic chemicals subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part372. (Zinc compounds)

CERCLA Hazardous Substance: Listed. (Zinc and compounds)

California Prop. 65 WARNING: This product contains a chemical known to the State of California to cause cancer. The listing of titanium dioxide (airborne, unbound particles of respirable size) is effective September 2. 2011. The listing does not cover titanium dioxide when it remains bound within a product matrix.

HMIS Rating

Health	1	Flammability	0
Reactivity	0	Personal Protection	E

Chemical Safety Assessment

A Chemical Safety Assessment has not been carried out for this mixture.

16. OTHER INFORMATION

Preparation Date : Mar. 07, 2016

References:

1) ICSC (2002)
2) HSDB (2005)
3) IUCLID (2000)
4) Fragrance Journal, No. 80, p. 40 (1986)
5) IPCS Environmental Health Criteria 24, Titanium (1982)
6) Kanagawa Environmental Research Center (URL; http://www.k-erc.pref.kanagawa.jp/kisnet/index.htm)
7) Information on Chemicals, ECHA (URL; http://echa.europa.eu/web/guest/information-on-chemicals)
8) NTP DB (2005)
9) IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Vol. 93, p. 193 (2010)
10) Carcinogenesis, Vol. 18, No. 2, p. 423 (1997)
11) Toxicological Sciences, Vol. 70, p. 86 (2002)
12) ACGIH (2001)
13) IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Vol. 47, p. 307 (1989)
14) The Annals of Occupational Hygiene, Vol. 49, No. 6, p. 462 (2005)
15)IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, vol.68, p41
16) National Cancer Institute Technical Report, No. 97 (1979)
17) DFGOT, Vol. 2 (1991)
18) Patty's Toxicology (5th Edition, 2001)
19) AQUIRE (2003)

Disclaimer

Information provided in this safety data sheet (SDS) is described based on the best knowledge and information available at the date of publication. This SDS will be amended when any new knowledge is obtained. The information given, including safe handling, use, storage, transport, disposal and release, is described for normal conditions. You are encouraged to collect any specific information you need for yourself. ISHIHARA SANGYO KAISHA, LTD. gives no guarantees for quality specifications or use, and assumes no responsibility for how this information is used.

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Legend

ICSC:	International Chemical Safety Cards
HSDB:	Hazardous Substances Data Bank
IUCLID:	International Uniform Chemical Information Database
IPCS:	International Programme on Chemical Safety
ECHA:	European Chemicals Agency
NTP:	National Toxicology Program
IARC:	International Agency for Research on Cancer
ACGIH:	The American Conference of Governmental Industrial Hygienists
DFGOT:	Occupational Toxicants Critical Data Evaluation for MAK Values and Classification of Carcinogens
AQUIRE:	Aquatic Toxicity Information Retrieval
OSHA:	Occupational Safety and Health Administration
NIOSH:	National Institute for Occupational Safety and Health