

Safety Data Sheet



Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name	• Titanium Dioxide
Synonyms	• Titanium Oxide
CAS Number	• 13463-67-7
Product Code	• 7011; 7021; 7025; 9372; 9374; 9375, #1000, #1001
EC Number	• 236-675-5
Molecular Formula	• :O 2:Ti 1:

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified use(s)	• Thermal spray powder
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1.3 Details of the supplier of the safety data sheet

Manufacturer	• Saint-Gobain Ceramic Materials 1 New Bond Street Mail Stop 525-203 Worcester, MA 01615-0137 United States www.abrasivematerials.saint-gobain.com cermatworcester@saint-gobain.com
Telephone (General)	• 1-800-243-0028

1.4 Emergency telephone number

Manufacturer	• 1-800-535-5053
Manufacturer	• 800-424-9300 - CHEMTREC

Section 2: Hazards Identification

EU/EEC

According to EU Directive 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]
According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP	• Carcinogenicity 2 - H351 Specific Target Organ Toxicity Repeated Exposure 1 - H372
DSD/DPD	• Carcinogenic Substances - Category 3 Toxic (T) R40, R48/23

2.2 Label Elements

CLP

DANGER

- Hazard statements**
- H351 - Suspected of causing cancer.
 - H372 - Causes damage to organs -Lungs through prolonged or repeated exposure via Inhalation

Precautionary statements

- Prevention**
- P201 - Obtain special instructions before use.
 - P202 - Do not handle until all safety precautions have been read and understood.
 - P261 - Avoid breathing dust.
 - P264 - Wash thoroughly after handling.
 - P270 - Do not eat, drink or smoke when using this product.
 - P281 - Use personal protective equipment as required.
- Response**
- P308+P313 - IF exposed or concerned: Get medical advice/attention.
 - P314 - Get medical advice/attention if you feel unwell.
- Storage/Disposal**
- P405 - Store locked up.
 - P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

DSD/DPD



- Risk phrases**
- R40 - Limited evidence of a carcinogenic effect.
 - R48/23 - Toxic: danger of serious damage to health by prolonged exposure through inhalation.
- Safety phrases**
- S36 - Wear suitable protective clothing.
 - S37 - Wear suitable gloves.
 - S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
 - S53 - Avoid exposure - obtain special instructions before use.

2.3 Other Hazards

- CLP**
- According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.
- DSD/DPD**
- This product is considered dangerous according to the European Directive 67/548/EEC.

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

- OSHA HCS 2012**
- Carcinogenicity 2 - H351
 - Specific Target Organ Toxicity Repeated Exposure 1 - H372

2.2 Label elements

OSHA HCS 2012

DANGER**Precautionary statements**

- Prevention**
- Obtain special instructions before use. - P201

Do not handle until all safety precautions have been read and understood. - P202
 Avoid breathing dust. - P261
 Wash thoroughly after handling. - P264
 Do not eat, drink or smoke when using this product. - P270
 Wear protective gloves/protective clothing/eye protection/face protection. - P280
 User personal protective equipment as required. - P281

- Response** ● IF exposed or concerned: Get medical advice/attention. - P308+P313
 Get medical advice/attention if you feel unwell. - P314
- Storage/Disposal** ● Store locked up. - P405
 Dispose of content and/or container in accordance with local, regional, national, and/or international regulations. - P501

2.3 Other hazards

OSHA HCS 2012

- Under United States Regulations (29 CFR 1900.1200 - Hazard Communication Standard) this product is considered Hazardous.

Canada

According to WHMIS

2.1 Classification of the substance or mixture

WHMIS

- Other Toxic Effects - D2A

2.2 Label elements

WHMIS



- Other Toxic Effects - D2A

2.3 Other hazards

WHMIS

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

See Section 12 for Ecological Information.

Section 3 - Composition/Information on Ingredients

3.1 Substances

Composition					
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Titanium dioxide	CAS:13463-67-7 EC Number:236-675-5	>= 99%	NDA	EU DSD/DPD: Self Classified: Xn Carc. 3, R40; Xn, R48/20 EU CLP: Self Classified: Carc. 2 H350; STOT RE 1 (Lungs, Inhalation), H372 OSHA HCS 2012: Carc. 2; STOT RE 1 (Lungs, Inhalation)	NDA

3.2 Mixtures

- Material does not meet the criteria of a mixture in accordance with Regulation (EC) No 1272/2008.

See Section 11 for Toxicological Information.

Section 4 - First Aid Measures

4.1 Description of first aid measures

- Inhalation**
- Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. If signs/symptoms continue, get medical attention.
- Skin**
- In case of contact with substance, immediately flush skin with running water for at least 20 minutes. If irritation develops and persists, get medical attention.
- Eye**
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. Get medical attention if irritation persists.
- Ingestion**
- Do not give anything by mouth to an unconscious person. Get medical attention.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

- Notes to Physician**
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5 - Firefighting Measures

5.1 Extinguishing media

- Suitable Extinguishing Media**
- In case of fire use media as appropriate for surrounding fire.

- Unsuitable Extinguishing Media**
- No data available.

5.2 Special hazards arising from the substance or mixture

- Unusual Fire and Explosion Hazards**
- Material is non-combustible and is not expected to pose a fire or explosion hazard.

- Hazardous Combustion Products**
- No data available.

5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

- Personal Precautions**
- Do not touch or walk through spilled material. Do not breathe dust. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment. Ventilate the area before entry.

- Emergency Procedures**
- Ventilate closed spaces before entering. Keep unauthorized personnel away.

6.2 Environmental precautions

- Avoid release to the environment.

6.3 Methods and material for containment and cleaning up

- Containment/Clean-up Measures**
- Avoid generating dust.
If dust clean up is necessary be sure to use vacuum cleaner equipped with HEPA filter.
SMALL DRY SPILLS: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
LARGE SPILLS: Cover powder spill with plastic sheet or tarp to minimize spreading.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Do not use in areas without adequate ventilation. Wear personal protective equipment. Do not breathe dust. Minimize dust generation and accumulation. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Ventilate enclosed areas. Keep container closed.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines						
	Result	ACGIH	Argentina	Australia	Austria	Canada British Columbia
Titanium dioxide (13463-67-7)	TWAs	10 mg/m3 TWA	10 mg/m3 TWA [CMP]	10 mg/m3 TWA (containing no asbestos and <1% crystalline silica, inhalable dust)	Not established	10 mg/m3 TWA (total dust); 3 mg/m3 TWA (respirable fraction)
	MAKs	Not established	Not established	Not established	5 mg/m3 TWA [TMW] (alveolar dust, respirable fraction)	Not established
	STELs	Not established	Not established	Not established	10 mg/m3 STEL [KZW] (alveolar dust, respirable fraction, 2 X 60 min)	Not established
Exposure Limits/Guidelines (Con't.)						
	Result	Canada Manitoba	Canada New Brunswick	Canada Northwest Territories	Canada Nova Scotia	Canada Nunavut
Titanium dioxide (13463-67-7)	TWAs	10 mg/m3 TWA	10 mg/m3 TWA	5 mg/m3 TWA (respirable mass); 10 mg/m3 TWA (total mass)	10 mg/m3 TWA	5 mg/m3 TWA (respirable mass); 10 mg/m3 TWA (total mass)
Exposure Limits/Guidelines (Con't.)						
	Result	Canada Ontario	Canada Quebec	Canada Yukon	China	France
Titanium dioxide (13463-67-7)	STELs	Not established	Not established	20 mg/m3 STEL (as Ti)	16 mg/m3 STEL (total dust)	Not established
	TWAs	10 mg/m3 TWA (total dust)	10 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, total dust)	30 mppcf TWA (as Ti); 10 mg/m3 TWA (as Ti)	8 mg/m3 TWA (total dust)	10 mg/m3 TWA [VME] (as Ti)

Exposure Limits/Guidelines (Con't.)						
	Result	Indonesia	Israel	Korea	Malaysia	Mexico
Titanium dioxide (13463-67-7)	STELs	Not established	Not established	Not established	Not established	20 mg/m ³ STEL [LMPE-CT] (as Ti)
	TWAs	10 mg/m ³ TWA	10 mg/m ³ TWA	10 mg/m ³ TWA	10 mg/m ³ TWA	10 mg/m ³ TWA LMPE-PPT (as Ti)
Exposure Limits/Guidelines (Con't.)						
	Result	OSHA	Russia	Singapore	South Africa	Switzerland
Titanium dioxide (13463-67-7)	MAKs	Not established	Not established	Not established	Not established	3 mg/m ³ TWA [MAK] (respirable)
	TWAs	15 mg/m ³ TWA (total dust)	10 mg/m ³ TWA (aerosol)	10 mg/m ³ PEL	10 mg/m ³ TWA (total inhalable dust); 5 mg/m ³ TWA (respirable dust)	Not established
Exposure Limits/Guidelines (Con't.)						
	Result	Taiwan				
Titanium dioxide (13463-67-7)	TWAs	10 mg/m ³ TWA				

Exposure Control Notations

Germany DFG

•Titanium dioxide (13463-67-7): **Carcinogens:** (Category 3A (could be carcinogenic for man, inhalable fraction with the exception of ultra small particles))

8.2 Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory

- For limited exposure use an N95 dust mask. For prolonged exposure use an air-purifying respirator with high efficiency particulate air (HEPA) filters. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face

- Wear safety goggles.

Hands

- Wear appropriate gloves.

Skin/Body

- Wear long sleeves and/or protective coveralls.

General Industrial Hygiene Considerations

- Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

Environmental Exposure Controls

- Follow best practice for site management and disposal of waste.

Key to abbreviations

PEL = Permissible Exposure Level determined by the Occupational Safety and Health Administration (OSHA)

MAK = Maximale Arbeitsplatz Konzentration is the maximum permissible concentration

STEL = Short Term Exposure Limits are based on 15-minute exposures

TWAEV = Time-Weighted Average Exposure Value

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

ACGIH = American Conference of Governmental Industrial Hygiene

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Solid	Appearance/Description	Grayish/blackish powder.
Color	Black Grayish .	Odor	Data lacking
Particulate Type	Dust	Odor Threshold	Data lacking
General Properties			
Boiling Point	2500 to 3000 C(4532 to 5432 F) TiO	Melting Point	1800 C(3272 F) TiO
Decomposition Temperature	Data lacking	pH	Data lacking
Specific Gravity/Relative Density	Data lacking	Density	Data lacking
Water Solubility	Insoluble TiO	Viscosity	Data lacking
Explosive Properties	Not explosive.	Oxidizing Properties:	Not an oxidizer.
Volatility			
Vapor Pressure	Data lacking	Vapor Density	Data lacking
Evaporation Rate	Data lacking		
Flammability			
Flash Point	Data lacking	UEL	Data lacking
LEL	Data lacking	Autoignition	Data lacking
Flammability (solid, gas)	Not flammable.		
Environmental			
Octanol/Water Partition coefficient	Data lacking		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization not indicated.

10.4 Conditions to avoid

- No data available.

10.5 Incompatible materials

- No data available.

10.6 Hazardous decomposition products

- No data available.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

Component Name	CAS	Data
Titanium dioxide (>= 99%)	13463-67-7	Acute Toxicity: ihl-mus TClO:10 mg/m3/6H/13W-I; Irritation: skn-hmn 300 ug/3D-I MLD; Tumorigen/Carcinogen: ihl-rat TClO:250 mg/m3/6H/2Y-I
GHS Properties		Classification
Acute toxicity		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Aspiration Hazard		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Carcinogenicity		EU/CLP • Carcinogenicity 2 OSHA HCS 2012 • Carcinogenicity 2
Germ Cell Mutagenicity		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Skin corrosion/Irritation		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Skin sensitization		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
STOT-RE		EU/CLP • Specific Target Organ Toxicity Repeated Exposure 1 OSHA HCS 2012 • Specific Target Organ Toxicity Repeated Exposure 1
STOT-SE		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Toxicity for Reproduction		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Respiratory sensitization		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Serious eye damage/Irritation		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met

Route(s) of entry/exposure

- Inhalation, Skin, Eye, Ingestion

Medical Conditions Aggravated by Exposure

- Disorders of the lungs.

Potential Health Effects**Inhalation****Acute (Immediate)**

- Exposure to dust may cause irritation. Processes such as cutting, grinding, crushing, or impact may result in generation of excessive amounts of airborne dusts in the workplace. Dust may affect the lungs but reactions are typically reversible.

Chronic (Delayed)

- Repeated and prolonged exposure to dust may cause lung injury and/or disease.

Skin**Acute (Immediate)**

- Exposure to dust may cause mechanical irritation.

Chronic (Delayed)

- No data available.

Eye**Acute (Immediate)**

- Exposure to dust may cause mechanical irritation. Excessive concentrations of dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.

Chronic (Delayed)

- No data available.

Ingestion**Acute (Immediate)**

- Excessive concentrations of dust in the workplace may cause mechanical irritation to mucous membranes.

Chronic (Delayed)

- No data available.

Carcinogenic Effects

- Repeated and prolonged exposure may cause cancer.

Carcinogenic Effects		
	CAS	IARC
Titanium dioxide	13463-67-7	Group 2B-Possible Carcinogen

Section 12 - Ecological Information**12.1 Toxicity**

- Material data lacking.

12.2 Persistence and degradability

- Material data lacking.

12.3 Bioaccumulative potential

- Material data lacking.

12.4 Mobility in Soil

- Material data lacking.

12.5 Results of PBT and vPvB assessment

- No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

- No studies have been found.

Section 13 - Disposal Considerations**13.1 Waste treatment methods****Product waste**

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	NDA	Not regulated	NDA	NDA	NDA
TDG	NDA	Not regulated	NDA	NDA	NDA
IMO/IMDG	NDA	Not regulated	NDA	NDA	NDA
IATA/ICAO	NDA	Not regulated	NDA	NDA	NDA

14.6 Special precautions for user

- None known.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

- Not relevant.

Section 15 - Regulatory Information

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

SARA Hazard Classifications • Chronic

State Right To Know				
Component	CAS	MA	NJ	PA
Titanium dioxide	13463-67-7	Yes	Yes	Yes

Inventory						
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	Japan ENCS
Titanium dioxide	13463-67-7	Yes	No	Yes	No	Yes

Inventory (Con't.)		
Component	CAS	TSCA
Titanium dioxide	13463-67-7	Yes

Malaysia

Labor

Malaysia - Control of Industrial Major Accident Hazards - Threshold Quantities

- Titanium dioxide 13463-67-7 Not Listed

Malaysia - Occupational Safety & Health - Risk Phrases

- Titanium dioxide 13463-67-7 Not Listed

Malaysia - Occupational Safety & Health - Safety Phrases

- Titanium dioxide 13463-67-7 Not Listed

Singapore

Environment

Singapore - Air Impurities Emission Limits

- Titanium dioxide 13463-67-7 Not Listed

Singapore - Hazardous Substance Transport Quantities

- Titanium dioxide 13463-67-7 Not Listed

Singapore - List of Hazardous Substances

- Titanium dioxide 13463-67-7 Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

- Titanium dioxide 13463-67-7 carcinogen, initial date 9/2/11 (airborne, unbound particles of respirable size)

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

15.3 Other Information

- WARNING: This product contains a chemical known to the State of California to cause cancer.

Section 16 - Other Information

Last Revision Date 05/July/2013

Preparation Date 09/November/2016

Disclaimer/Statement of Liability

- Reasonable care has been taken in the preparation of this information, but the supplier gives no warranty of merchantability or of fitness for a particular purpose. Any product purchased is sold on the assumption the purchaser will make his own tests to determine the quality and suitability of the product. Supplier expressly disclaims any and all liability for incidental and/or consequential property damage arising out of the use of this product. No information provided shall be deemed to be a recommendation to use any product in conflict with any existing patent rights. Read the Safety Data Sheet before handling product.

Key to abbreviations

NDA = No data available
