

# SAFETY DATA SHEET

**Issuing Date**  
01-October-10

**Revision Date**  
06-May-13

**Revision Number**  
3.1

## 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

**Product Name** Titanium Metal Powder

**Recommended use** Production of titanium metal components.

**Company** PRODUCTION:  
Cristal Metals Inc.  
1501 Titanium Drive  
Ottawa, IL 61350  
Telephone: 815-431-4340- -  
control room

SAMPLES/ R&D:  
Cristal Metals Inc.  
20634 Gaskin Drive  
Lockport, IL 60441

For further information, please contact:

**E-mail Address** regulatory.query@cristal.com

**Emergency Telephone Number** 1 800 638 333 - - Australia only  
+800-2537-8747 for Asia Pacific

## 2. HAZARDS IDENTIFICATION

**Description of classification** Classified as hazardous according to criteria of NOHSC.

**Overall hazardous statement** Hazardous substance. Dangerous goods.



**Hazard Statements**  
• Highly Flammable.  
**GHS/CLP**

**REGULATION (EC) No 1272/2008**

Aspiration toxicity	Not classified
Acute oral toxicity	Not classified
Acute dermal toxicity	Not classified
Acute Toxicity - Gases	Not classified

Acute Toxicity - Vapors	Not classified
Acute Toxicity - Dusts and Mists	Not classified
Skin corrosion/irritation	Not classified
Serious eye damage/eye irritation	Not classified
Respiratory sensitization	Not classified
Skin sensitization	Not classified
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified
Reproductive toxicity	Not classified
Specific target organ systemic toxicity (single exposure)	Not classified
Specific target organ systemic toxicity (repeated exposure)	Not classified
Acute aquatic toxicity	Not classified
Chronic aquatic toxicity	Not classified
Flammable solids .	Category 2

**Symbol(s)** F - Highly flammable

#### Precautionary Statements

- Keep away from sources of ignition - No smoking.
- Take precautionary measures against static discharge.
- In case of fire, use dry sand (NEVER use water).

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Weight %
Titanium	7440-32-6	100

### 4. FIRST AID MEASURES

<b>General Advice</b>	If first aid is needed, call emergency medical service. Move victim to a safe isolated area.
<b>Inhalation</b>	If not breathing, give artificial respiration. Administer oxygen if breathing is difficult. Seek immediate medical attention/advice. Move to fresh air.
<b>Skin contact</b>	Wash off immediately with soap and plenty of water. Remove and wash contaminated clothing before re-use. In the event of skin reaction to metal powder, contact a physician.
<b>Eye contact</b>	Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.
<b>Ingestion</b>	Immediate medical attention is required.
<b>Notes to physician</b>	Treat symptomatically.
<b>Aggravated Medical Conditions</b>	None known.

### 5. FIRE-FIGHTING MEASURES

<b>Suitable Extinguishing Media</b>	Class D extinguishing agents on fines, dust or molten metal. Dry sand. Sodium chloride powder.
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**Extinguishing media which must not be used for safety reasons** DO NOT use A-B-C fire extinguisher. Do not use halon type extinguisher. Do not use water, carbon dioxide or dry chemical extinguisher.

**Special Exposure Hazards Arising from the Substance/Preparation Including Combustion Products and Gases** Contact with water in a fire event will evolve flammable hydrogen gas. Most fire extinguishing media will cause hydrogen evolution. When the fire is put out, hydrogen may accumulate in poorly ventilated or confined areas and result in flash fire or explosion if ignited. Dusts or fumes may form explosive mixtures in air. May be ignited by heat, sparks or flames. Containers may explode when heated.

Powder particulates are EXTREMELY sensitive to ignition. Minimum Ignition Energy: < 3mJ. Take precautionary measures against static discharge.

**Special protective equipment for firefighters** As in any fire, wear self-contained breathing apparatus and full protective gear.

## 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions** Keep people away from spill/leak. Remove all sources of ignition. Ensure adequate ventilation. Use personal protective equipment.

**Environmental Precautions** Prevent further leakage or spillage if safe to do so. Use dyking to prevent run-off from entering waterways.

**Methods for cleaning up** DO NOT VACUUM. There are reports of titanium dust explosion even when using an explosion-proof vacuum. Cover spill with inert material (e.g. dry sand or earth), then place in a metal waste container with sealing lid. Use non-sparking tools and equipment. Shovel or sweep up. Take precautionary measures against static buildup.

## 7. HANDLING AND STORAGE

**Technical Measures/Precautions** Read and follow guidance herein for the safe handling and storage of this product.

**Safe Handling Advice** Fine dust dispersed in air may ignite. Handle under inert gas, protect from moisture. Keep away from open flames, hot surfaces and sources of ignition. Do not smoke. Keep away from oxidizing materials (e.g. peroxide, bleach, acids). Take precautionary measures against static discharges. Humidity >50% will help prevent electrostatic buildup.

**Storage** Keep in a dry, cool and well-ventilated place. Keep away from oxidizing materials (e.g. peroxide, bleach, acids). Keep dry and under an inert atmosphere (argon) in the container. Clean up any spilled material immediately. Keep all sources of ignition away from spill. In the event of fire, powder must not be exposed to water. Be aware that building sprinkler systems may contribute to material hazard in the event of a spilled powder fire.

An H-3 Occupancy rating is required for storage of flammable solids in quantities greater than 125 pounds based on the International Building Code (IBC) and the International Fire Code (IFC).

**Materials to avoid** Oxidizing agents. Acids. Halogens. Halides. Metal oxides.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### Occupational Exposure Controls

**Exposure limits** No exposure standard allocated.

**Biological standards** No biological limit allocated.

<b>Engineering measures</b>	Ensure adequate ventilation, especially in confined areas. Do not use portable fans as this may create or spread dust.
<b>Environmental exposure controls</b>	Clean up any spills immediately.

**Personal Protective Equipment**

<b>Respiratory protection</b>	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection with HEPA filtration should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.
<b>Eye/Face Protection</b>	Safety glasses with side shields or goggles or face shield.
<b>Skin and body protection</b>	Fire resistant clothing.
<b>Hand protection</b>	Leather gloves.
<b>Hygiene Measures</b>	Handle in accordance with good industrial hygiene and safety practice. Prevent contact with skin eyes and clothing. Do not eat, drink or smoke when using this product. Wash hands before breaks and at the end of workday.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	Silver or black metal powder
<b>Odor</b>	Odorless
<b>Physical State</b>	Solid
<b>pH</b>	Not applicable
<b>Flash Point</b>	Not applicable
<b>Autoignition Temperature</b>	(Powder cloud) 480 °C / 896 °F
<b>Decomposition temperature</b>	No information available
<b>Boiling Point/Range</b>	3287 °C / 5949 °F
<b>Melting Point/Range</b>	1662 °C / 3024 °F
<b>Explosive Properties</b>	Kst = 9 bar.m/s (5-7% AD) Kst = 92 bar.m/s (15-25% AD) AD = Apparent Density
<b>Oxidizing Properties</b>	Not applicable
<b>Evaporation Rate</b>	Not applicable
<b>Vapor Pressure</b>	Not applicable
<b>Vapor Density</b>	Not applicable
<b>Density</b>	4.5 g/cm <sup>3</sup>
<b>Bulk Density</b>	0.23 - 0.32 g/cm <sup>3</sup> (5-7% AD) 0.68 - 1.14 g/cm <sup>3</sup> (15-25% AD) AD = Apparent Density
<b>Solubility</b>	No information available
<b>Water Solubility</b>	Insoluble in water
<b>Partition coefficient: n-octanol/water</b>	No information available
<b>Viscosity</b>	Not applicable
<b>Molecular Weight</b>	47.867 g/mol
<b>Additional Notes:</b>	Minimum Ignition Energy (MIE): <3 mJ

## 10. STABILITY AND REACTIVITY

<b>Stability</b>	Stable in Air. Will burn if ignited.
<b>Conditions to avoid</b>	Keep away from open flames, hot surfaces and sources of ignition. Avoid materials which can cause static discharge. Prior to filling or dispensing from container, ground the container liner and the container. Avoid dust formation.

**Materials to avoid** Oxidizing agents. Acids. Halogens. Halides. Metal oxides.

**Hazardous decomposition products** Metal oxide fumes.

**Hazardous Polymerization** Hazardous polymerization does not occur.

**Hazardous Reactions** May liberate hydrogen gas in contact with water in the presence of a fire.

## 11. TOXICOLOGICAL INFORMATION

### Acute Toxicity

#### Component information

### Potential Health Effects

<b>Inhalation</b>	Inhalation will cause irritation to the lungs and mucous membrane.
<b>Eye contact</b>	Powder is irritating to the eyes on contact. Irritation to the eyes will cause watering and redness.
<b>Skin contact</b>	No immediate effect.
<b>Ingestion</b>	Ingestion may cause irritation to mucous membranes.
<b>Sensitisation</b>	None known.

### Chronic effects

<b>Chronic effects</b>	Prolonged skin contact may cause inflammation with symptoms of reddening, scaling and itching.
<b>Carcinogenicity</b>	Not carcinogenic.
<b>Mutagenic effects</b>	Not a mutagen.
<b>Reproductive toxicity</b>	Not a reproductive toxin.
<b>Developmental toxicity</b>	Not a developmental toxin.

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity

**Ecotoxicity effects** None known.

**Persistence and degradability** Persistent and not biodegradable.

**Bioaccumulative Potential** Titanium metal is expected to be bioaccumulative.

**Mobility** Not mobile (inorganic metal).

### 13. DISPOSAL CONSIDERATIONS

**Waste from residues/unused products**

If the product is to be disposed 'as received' it is considered to be a hazardous waste having the characteristic of ignitability. Dispose of in accordance with local regulations.

**Contaminated packaging**

Clean with water. Reuse or recycle resulting washing effluents. Empty containers should be taken for local recycling, recovery or waste disposal. Dispose of in accordance with local regulations.

### 14. TRANSPORT INFORMATION

**DOT**

**Proper Shipping Name** Metal powder, flammable, n.o.s.  
**Hazard Class** 4.1  
**UN-No** UN3089  
**Packing Group** II

**ADR**

**Proper Shipping Name** Metal powder, flammable, n.o.s.  
**Hazard Class** 4.1  
**UN-No** U3089  
**Classification Code** F3

**ICAO**

**UN-No** UN3089  
**Proper Shipping Name** Metal powder, flammable, n.o.s.  
**Hazard Class** 4.1  
**Packing Group** II  
**Description** UN3089, Metal powder, flammable, n.o.s., 4.1, PG II

**IMDG/IMO**

**Proper Shipping Name** Metal powder, flammable, n.o.s.  
**Hazard Class** 4.1  
**UN-No** UN3089  
**Packing Group** II  
**EmS No.** F-G, S-G

**IATA**

**UN-No** UN3089  
**Proper Shipping Name** Metal powder, flammable, n.o.s.  
**Hazard Class** 4.1  
**Packing Group** II  
**ERG Code** 3L

### 15. REGULATORY INFORMATION

Standard for the Uniform Scheduling of Drugs and Poisons(SUSDP) No Poisons Schedule number allocated.

#### International Inventories

Chemical Name	Titanium
EINECS	231-142-3
ELINCS	-
Philippines (PICCS)	X
Japan (ENCS)	-
Canada (DSL)	X

Chemical Name	Titanium
NDSL	-
USA (TSCA)	Present
China (IECSC)	X
Australia (AICS)	X
Korea (KECL)	KE-33881
New Zealand (NZIoC)	X

#### Legend

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory

**EINECS/ELINCS** - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List

**PICCS** - Philippines Inventory of Chemicals and Chemical Substances

**ENCS** - Japan Existing and New Chemical Substances

**IECSC** - China Inventory of Existing Chemical Substances

**AICS** - Australian Inventory of Chemical Substances

**KECL** - Korean Existing and Evaluated Chemical Substances

**NZIoC** - New Zealand Inventory of Chemicals

## 16. OTHER INFORMATION

**Text of R-phrases mentioned in Section 2** R11 - Highly flammable.

**Revision Date** 06-May-13

**Reason for revision** Section 1

**Sources of key data used to compile the datasheet** Industry data.

#### Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS