

Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product Identifier

Product name Titanium Alloy Powder

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

Recommended Use Production of titanium metal components

Uses advised against For use in industrial installations only.

1.3. Details of the supplier of the safety data sheet

Manufacturer Cristal Metals Inc.
1501 Titanium Drive
Ottawa, IL 61350
+1.815.431.4340

For further information, please contact

E-mail address Regulatory.query@cristal.com

1.4. Emergency telephone number

Emergency telephone SGS (Europe): + 32 (0)3-575-5555

Emergency telephone - §45 - (EC)1272/2008	
Europe	112

Section 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008

FLAMMABLE SOLIDS	Category 2
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2.2. Label Elements



Signal Word

WARNING

Hazard statements

H228 - Flammable solid

Precautionary Statements - EU (§28, 1272/2008)

P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking

P240 - Ground/bond container and receiving equipment

P241 - Use explosion-proof electrical/ ventilating/ lighting/ equipment

P280 - Wear protective gloves and eye/face protection

P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish

2.3. Other Hazards**Other Hazards**

Minimum ignition energy: < 3 mJ (ASTM E-2019).

Airborne dust is extremely sensitive to ignition.

Powder may present an explosion and deflagration hazard risk when dispersed and ignited in air.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	EC No	CAS No	weight-%	Classification according to Regulation (EC) No. 1272/2008 [CLP]	REACH registration number
Titanium	231-142-3	7440-32-6	88 - 96%	-	No data available
Vanadium	231-171-1	7440-62-2	2 - 5%	-	No data available
Aluminum	231-072-3	7429-90-5	2 - 7%	Flam. Sol. 1 (H228) Water-react. 2 (H261)	No data available

Section 4: FIRST AID MEASURES

4.1. Description of first aid measures**Inhalation**

Remove from exposure, lie down. If symptoms persist, call a physician.

Skin contact.

Wash off immediately with plenty of water. If skin irritation persists, call a physician.

Eye Contact

Rinse thoroughly with plenty of water, also under the eyelids. If eye irritation persists: Get medical advice/attention.

Ingestion

Rinse mouth. Call a physician or poison control center immediately.

Self-protection of the first aider

Use personal protective equipment as required. Remove all sources of ignition. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms None known.

4.3. Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

Section 5: FIRE FIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media Class D extinguishing agents on fines, dust or molten metal. Dry sand. Sodium chloride powder

Unsuitable Extinguishing Media Do NOT use A-B-C fire extinguisher. Do not use halon type extinguisher. Do not use water, carbon dioxide or dry chemical extinguisher.

5.2. Special hazards arising from the substance or mixture

Specific hazards arising from the chemical FLAMMABLE. Minimum ignition energy: < 3 mJ (ASTM E-2019). Once fire begins, product is difficult to extinguish. Substance will react with water (some violently), releasing corrosive and/or toxic gases. Containers may explode when heated or if contaminated with water. Dusts or fumes may form explosive mixtures in air. May be ignited by heat, sparks or flames.

5.3. Advice for firefighters

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. In the event of a fire, isolate from additional fuel (titanium metal powder).

Section 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Evacuate personnel to safe areas. Take precautionary measures against static discharges. Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

For emergency responders Remove all sources of ignition. Approach area from upwind. Use personal protection recommended in Section 8.

6.2. Environmental precautions

Environmental Precautions Prevent entry into waterways, sewers, basements or confined areas.

6.3. Methods and material for containment and cleaning up

Methods for Containment Cover with dry sand/earth. Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. Use clean non-sparking tools to collect absorbed material.

Methods for cleaning up Do not vacuum!. Avoid creating dust. Ground and bond containers when transferring material. Take precautionary measures against static discharges. Sweep up and shovel into suitable containers for disposal. Use clean non-sparking tools to collect absorbed material.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

6.4. Reference to other sections

Reference to other sections See section 13 for more information.

Section 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Advice on safe handling

Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Take precautionary measures against static discharges. Avoid generation of dust.

General hygiene considerations

Do not eat, drink or smoke when using this product. Take off all contaminated clothing and wash it before reuse. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Incompatible with oxidizing agents. Be aware that building sprinkler systems may contribute to material hazard in the event of spilled powder fire. An H-3 occupancy rating is required for storage of flammable solids in quantities greater than 57kg based on International Building Code (IBC) and International Fire Code (IFC).

Packaging materials

Keep only in original container.

7.3. Specific end use(s)

Risk Management Methods (RMM) The information required is contained in this Safety Data Sheet.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure Limits

Chemical name Aluminum 7429-90-5	Belgium -	United Kingdom STEL: 30 mg/m ³ STEL: 12 mg/m ³ TWA: 10 mg/m ³ TWA: 4 mg/m ³	France TWA: 10 mg/m ³ TWA: 5 mg/m ³	Spain TWA: 10 mg/m ³ TWA: 5 mg/m ³
Chemical name Vanadium 7440-62-2	Germany Skin TWA: 0.005 mg/m ³ TWA: 0.03 mg/m ³	Italy -	Netherlands -	Greece -
Aluminum 7429-90-5	TWA: 4 mg/m ³ TWA: 1.5 mg/m ³	-	-	-
Chemical name Vanadium 7440-62-2	Czech Republic Ceiling: 0.15 mg/m ³ TWA: 0.05 mg/m ³	Denmark -	Austria STEL 1 mg/m ³ TWA: 0.5 mg/m ³	Switzerland -
Aluminum 7429-90-5	TWA: 10.0 mg/m ³	TWA: 5 mg/m ³ TWA: 2 mg/m ³	STEL 20 mg/m ³ TWA: 10 mg/m ³	TWA: 3 mg/m ³
Chemical name Titanium 7440-32-6	Poland STEL: 30 mg/m ³ TWA: 10 mg/m ³	Norway -	Ireland -	Sweden -
Vanadium 7440-62-2	-	TWA: 0.2 mg/m ³ Ceiling: 0.05 mg/m ³ STEL: 0.6 mg/m ³	-	-
Aluminum 7429-90-5	TWA: 2.5 mg/m ³ TWA: 1.2 mg/m ³	TWA: 5 mg/m ³ STEL: 5 mg/m ³	TWA: 1 mg/m ³ STEL: 3 mg/m ³	5 mg/m ³ LLV (total dust); 2 mg/m ³ LLV (respirable dust)

Legend

Skin designation

Component	Austria	Switzerland	Poland	Norway	Ireland
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Aluminum 7429-90-5 (2 - 7%)	-	60	-	-	-
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Derived No Effect Level (DNEL)

No threshold concentrations derived.

Predicted No Effect Concentration (PNEC)

No threshold concentrations derived.

8.2. Exposure controls

Engineering controls Ensure adequate ventilation, especially in confined areas

Personal Protective Equipment

Eye/face Protection Wear safety glasses with side shields (or goggles). Face protection shield.

Hand protection Wear protective gloves.

Skin and Body Protection Wear fire/flame resistant/retardant clothing.

Respiratory protection If exposure limits are exceeded, use suitable certified respirators.

Environmental exposure controls Do not allow into any sewer, on the ground or into any body of water.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Solid
Appearance	Powder
Odor	Odorless
Color	Silver or black
Odor threshold	Not applicable

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH		Not applicable
Melting point/freezing point	1649 °C / 3000 °F	Melting point / melting range
Boiling point / boiling range	3287 °C / 5949 °F	-
Flash Point		Not applicable
Evaporation Rate		Not applicable
Flammability (solid, gas)		Highly flammable
Flammability Limit in Air		
Upper flammability limit:		Not applicable
Lower flammability limit:		Not applicable
Vapor pressure		Not applicable
Vapor Density		Not applicable
Specific gravity		No data available
Water solubility	Insoluble in water	-
Solubility(ies)		No data available
Partition coefficient		No data available
Autoignition Temperature	480 °C / 896 °F	powder cloud
Decomposition temperature		No data available
Kinematic viscosity		Not applicable
Dynamic viscosity		Not applicable
Explosive properties	Kst = 9 bar.m/s (5-7% AD) Kst = 92 bar.m/s (15-25% AD) AD = Apparent density	

	Limiting Oxygen Concentration: 3.5% (+/- 1%)
Oxidizing properties	Minimum Ignition Energy (MIE): <3mJ (ASTM E-2019) None known
9.2. Other information	
Softening point	No information available
Molecular weight	Not applicable
VOC content (%)	None
Density	No information available
Bulk Density	4.5 g/cm3

Section 10: STABILITY AND REACTIVITY

10.1. Reactivity

Reactivity None known.

10.2. Chemical stability

Stability Stable under normal conditions. Will be easily ignited by heat, sparks or flames. Fire Hazard.

Sensitivity to Mechanical Impact Self-ignition may be triggered at temperatures above 450C and in the presence of oxygen.
Sensitivity to Static Discharge Fine dust dispersed in air, in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

10.3. Possibility of hazardous reactions

Hazardous polymerization None under normal processing.

Possibility of hazardous reactions At temperatures >200°C, product is incompatible with halide acids, reducing acids, oxidizing agents, and halogens

10.4. Conditions to avoid

Conditions to Avoid Take precautionary measures against static discharges. Self-ignition may be triggered at temperatures above 450C and in the presence of oxygen.

10.5. Incompatible materials

Incompatible Materials Observe acid concentration and temperature limits, Avoid hydrogen fluoride solutions

10.6. Hazardous decomposition products

Hazardous decomposition products Metal oxides

Section 11: TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

Product does not present an acute toxicity hazard based on known or supplied information

Inhalation	As a nuisance dust, prolonged exposures above recommended levels may cause adverse effects on the lung.
Eye Contact	Contact with eyes may cause irritation.
Skin contact	No data available.
Ingestion	No data available.

Component Information

Skin corrosion/irritation	No information available.
Serious eye damage/eye irritation	No information available.
Sensitization	No information available.
Germ Cell Mutagenicity	None known.
Carcinogenicity	None known
Reproductive Toxicity	None known.
Developmental Toxicity	None known.
Teratogenicity	None known.
STOT - single exposure	No information available
STOT - repeated exposure	No information available
Target organ effects	None known.
Aspiration Hazard	Not applicable.

Section 12: ECOLOGICAL INFORMATION**12.1. Toxicity**

Ecotoxicity Not classified for acute. Not classified chronic.

12.2. Persistence and degradability

Persistence and degradability Not readily biodegradable.

12.3. Bioaccumulative potential

Bioaccumulation Bioaccumulative potential.

12.4. Mobility in soil

Mobility Not mobile.

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment This preparation contains no substance considered to be persistent, bioaccumulating nor toxic (PBT). This preparation contains substances considered to be very persistent and very bioaccumulating (vPvB).

12.6. Other adverse effects

Other adverse effects None known based on information supplied.

Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors.

Section 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from residues/unused products	Disposal should be in accordance with applicable regional, national and local laws and regulations.
Contaminated packaging	Do not reuse container. Improper disposal or reuse of this container may be dangerous and illegal.
Waste codes / waste designations according to List of Wastes / AVV	Waste codes should be assigned by the user based on the application for which the product was used

Section 14: TRANSPORT INFORMATION

Material may be shipped under argon gas.

IMDG

UN/ID no	3089
Proper Shipping Name	Metal powder, flammable, n.o.s.
Hazard Class	4.1
Packing group	II

RID

UN/ID no	3089
Proper Shipping Name	Metal powder, flammable, n.o.s.
Hazard Class	4.1
Packing group	II
Classification code	F3

ADR

UN/ID no	3089
Proper Shipping Name	Metal powder, flammable, n.o.s.
Hazard Class	4.1
Packing group	II
Classification code	F3

ICAO (air)

UN/ID no	3089
Proper Shipping Name	Metal powder, flammable, n.o.s.
Hazard Class	4.1
Packing group	II

IATA

UN/ID no	3089
Proper Shipping Name	Metal powder, flammable, n.o.s.
Hazard Class	4.1
Packing group	II

Section 15: REGULATORY INFORMATION

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

National Regulations

Germany

Water hazard class (WGK) strongly hazardous to water (WGK 3)

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

International Inventories

TSCA	Complies
DSL	Complies
EINECS/ELINCS	Complies
ENCS	Does not comply
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies
NZIC	Complies
TCSI	Complies

Legend:

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

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

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

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

NZIC - New Zealand Inventory of Chemicals

TCSI - Taiwan Chemical Substance Inventory

15.2. Chemical safety assessment

A Chemical Safety Assessment is not required for this substance.

Section 16: OTHER INFORMATION**Key or legend to abbreviations and acronyms used in the safety data sheet****Full text of H-Statements referred to under section 3**

H228 - Flammable solid

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation

Prepared by Product Stewardship Department

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Revision note New format

Training Advice This document contains important information to ensure the safe storage, handling and use of this product. It is the responsibility of your organization to ensure that the information contained within this document is communicated to the end user and that all necessary training to enable the product to be used correctly has been given.

Safety Data Sheet according to Regulation (EC) No. 830/2015 (REACH)

The information provided in this Safety Data Sheet 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 guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered 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 materials or in any process, unless specified in the text

End of Safety Data Sheet