



Material Safety Data Sheet

Issuing Date
21-April-11

Revision Date
17-April-12

Revision Number
2

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	Titanium Metal Powder, Wetted / Titanium Alloy Powder, Wetted
Description	Titanium powder wetted with not less than 25% water (a visible amount must be present). Includes (a) mechanically produced powder with particle size of <53µm, (b) chemically produced with particle size <840µm.
UN-No	UN1352
Recommended use	Production of titanium metal components. Fine titanium powder can be easily ignited when dry and wetting the powder reduces it's ignitability.
Manufactured by	International Titanium Powder - a Cristal Global Company 940 South Frontage Road, Suite 2000 Woodridge, Illinois 60517 Telephone: 815-431-4340 - - Control Room
Company Switchboard Number	815-834-2112 (non emergency)
Other Information	e-mail contact: cldemille@cristalglobal.com
Emergency Telephone Number	Chemtrec: 1-800-424-9300

2. HAZARDS IDENTIFICATION

Emergency Overview

Fine airborne dust is EXTREMELY sensitive to ignition. Minimum Ignition Energy (ASTM E 2019) = <3mJ.

In response to a spill, responders should refer to Emergency Response Guide 170 only.

Appearance
Silver or black metal powder

Physical State
Solid, wetted with water

Odor
Odorless

Potential Health Effects

Acute Toxicity

Skin Irritating to skin.

Inhalation May cause irritation of respiratory tract if powder is dry.

Ingestion May be harmful if swallowed.

Eyes Irritating to eyes.

Chronic Toxicity

Chronic effects None specifically known. Acute effects dominate.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Weight %
Titanium	7440-32-6	82 - 100
Aluminum	7429-90-5	0 - 8
Vanadium	7440-62-2	0 - 6

4. FIRST AID MEASURES

General Advice	Call 911 or emergency medical service. Move victim to a safe isolated area.
Eye contact	Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.
Skin contact	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.
Inhalation	Move to fresh air. If not breathing, give artificial respiration. Administer oxygen if breathing is difficult. Seek immediate medical attention/advice.
Ingestion	Immediate medical attention is required.
Notes to physician	None.
Protection of First-aiders	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

Flammable Properties	Containers may explode when heated (from boiling water). DRIED POWDER- If this material has dried out, it is extremely flammable and may be ignited by heat, sparks, or flames. Dusts may form explosive mixtures in air.
Flash Point	Not applicable
Instructions to Firefighters	Protect this material from heat. Use extreme caution with any container of this material which has bulged out; it may contain Hydrogen. DRIED POWDER- If dried powder has ignited, use sand or Class D fire extinguishing agents. DO NOT use water, chemical foam, dry chemical, halon, or carbon dioxide extinguishing agents, since they may form hydrogen gas in contact with burning titanium. Titanium is water-reactive at 700°C, releasing hydrogen which may cause an explosion.
Suitable Extinguishing Media	For DRIED POWDER- Use dry sand, Class D extinguishing agents, or sodium chloride powder.
Hazardous Combustion Products	Produce flammable and toxic gases on contact with water.
Sensitivity to Static Discharge	For DRIED POWDER: If this material has dried out it is EXTREMELY sensitive to ignition. The minimum Ignition Energy is less than 3mJ. Take precautionary measures against static discharge around dried powder.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions

Use personal protective equipment (see Section 8). Ensure adequate ventilation. Remove all sources of ignition. Keep people away from spill/leak.

Methods for Containment

Prevent further spillage if safe to do so. Prevent material from entering water ways. Clean up as soon as practical.

Methods for Cleaning Up

DO NOT VACUUM. There are reports of titanium dust explosion even when using an explosion-proof vacuum. Place absorbant material on spill (i.e. dry sand or earth), then shovel or sweep up and place in a metal waste container with a sealing lid. Shovel or sweep up using a natural fiber brush and non-sparking dustpan. Take precautionary measures against static buildup.

Other information

Refer to protective measures listed in Sections 7 and 8. See Section 12 for additional information. Refer to Section 13 for disposal considerations.

In response to a spill, responders should refer to Emergency Response Guide 170 only.

7. HANDLING AND STORAGE

Handling

Keep away from heat, sparks and open flame. No smoking. DRIED POWDER: Any fine dust that becomes dispersed in air may ignite. Handle under inert gas, protect from moisture. DO NOT VACUUM. Take precautionary measures against static discharges. Airborne dust is EXTREMELY sensitive to ignition - minimize dust formation. Minimum Ignition Energy to ignite airborne dust (ASTM E2019) = <3mJ. This is equivalent to static pick-up from walking across a floor. Humidity >50% will help prevent electrostatic buildup.

Storage

Store in original closed containers in a dry, cool place. Clean up any spilled material immediately. Keep all sources of ignition away from spill.

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).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL
Aluminum 7429-90-5		TWA: 15 mg/m ³ TWA: 5 mg/m ³ (vacated) TWA: 15 mg/m ³ (vacated) TWA: 5 mg/m ³
Vanadium 7440-62-2		Ceiling: 0.1 mg/m ³ Ceiling: 0.5 mg/m ³

Engineering measures

Ensure adequate ventilation, especially in confined areas. Do not use portable fans as this may create or spread dust.

Personal Protective Equipment**Eye/Face Protection**

Safety glasses with side shields or goggles or face shield.

Skin and Body Protection

Wear fire/flame resistant/retardant clothing. Leather gloves.

Respiratory Protection	If exposure limits are exceeded or irritation is experienced, MSHA/NIOSH approved respiratory protection 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.
Electrostatic Protection	Guidance for appropriate electrostatic protection (i.e. footwear) is available in NFPA 484 and in OSHA Directive Number CPL-03-00008.
Hygiene Measures	Do not eat, drink or smoke when using this product. Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Prevent contact with skin eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Silver or black metal powder	Odor	Odorless
Physical State	Solid, wetted with water	pH	8.8
Flash Point	Not applicable	Autoignition Temperature	(Powder cloud) 480 °C / 896 °F
Minimum Ignition Energy (mJ)	<3 (dust)	Boiling Point/Range	3287 °C / 5949 °F
Melting Point/Range	1640-1662 °C / 2984-3024 °F	Flammability Limits in Air	Highly flammable in dry powder form
Explosion Limits	No information available	Evaporation Rate	Not applicable
Water Solubility	Insoluble in water	Vapor Density	Not applicable
Vapor Pressure	Not applicable	Explosive Properties	Kst Value = 92 bar.m/s (ASTM E1226-10) when dry
Density	2.0 - 3.0 g/cm ³		
VOC Content(%)	Not applicable		

10. STABILITY AND REACTIVITY

Stability	Dry powder is stable in air. Will burn if ignited. DRIED POWDER is highly flammable. Titanium is water-reactive at 700°C, releasing hydrogen which may cause an explosion.
Incompatible Products	Acids. Halogens. Oxidizing agents. Metal oxides. Halides.
Conditions to avoid	Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	Metal oxide fumes.
Hazardous Reactions	During a fire, may liberate hydrogen gas in contact with water.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product information	Powder is irritating to the skin and eyes on contact. Inhalation will cause irritation to the lungs and mucous membrane. Irritation to the eyes will cause watering and redness. Reddening, scaling and itching are characteristics of skin inflammation.
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Chronic effects	None specifically known. Acute effects dominate.
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Carcinogenicity Not carcinogenic.

Target organ effects Eyes. Skin. Respiratory system.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects None known.

Persistence and degradability Persistent and not biodegradable.

Bioaccumulation/Accumulation Material may have some potential to bioaccumulate.

Mobility Not mobile (inorganic metal).

13. DISPOSAL CONSIDERATIONS

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

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

US EPA Waste Number D001

Chemical Name	California Hazardous Waste Status
Titanium	Ignitable (powder)
Aluminum	Ignitable (powder)

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name Titanium powder, wetted
Hazard Class 4.1
UN-No UN1352
Packing Group II

15. REGULATORY INFORMATION

International Inventories

Approved for use in Japan, but not listed on ENCS inventory.

USA (TSCA) Complies
Canada (DSL) Complies

European Union (EINECS)	Complies
Japan (ENCS)	Does not Comply
China (IECSC)	Complies
Korea (KECL)	Complies
Philippines (PICCS)	Complies
Australia (AICS)	Complies
New Zealand (NZIoC)	Complies

Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Chemical Name	CAS-No.	Weight %	SARA 313 - Threshold Values %
Aluminum	7429-90-5	0 - 8	1.0
Vanadium	7440-62-2	0 - 6	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	Yes
Reactivity Hazard	Yes

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

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CERCLA

This product, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Titanium		X			
Aluminum	X	X	X		X
Vanadium	X	X	X		

Other International Regulations

Chemical Name	Carcinogen Status	Exposure Limits
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Aluminum		Mexico: TWA= 10 mg/m ³
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Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

Division 4 - Flammable Solid



Chemical Name	NPRI
Aluminum	X

16. OTHER INFORMATION

HMIS Rating

Health Hazard 1
 Flammability Hazard 3
 Physical Hazard 1

Personal Protection F

Revision Date 17-April-12

Reason for revision Added reference to Emergency Response Guide 170 in Sections 2 and 6. Update to Stability in Section 10.

Disclaimer

The information provided on this MSDS 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 MSDS