

Material Safety Data Sheet

Revision Date: 3/9/11
 Supersedes Date: 11/2/10

SECTION I. PRODUCT AND COMPANY IDENTIFICATION

Chemical Name	Trade Name
Titanium Metal	6-4 Titanium Metal
Chemical Family	Formula
Group 4 (IVB) Transition Metal	Ti
Manufacturer	Manufacturer's Phone Number
Global Titanium Inc.	(800) 762-7602 or (313) 366-5300
Manufacturer's Address	Chemtrec Phone Number for Chemical Emergencies
19300 Filer Ave Detroit, MI 48234	(800) 424-9300
E-Mail	Company Website
info@globaltitanium.com	www.globaltitanium.com

SECTION II. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance & Odor	Warnings
Silver/Gray Solid; Odorless	Poisonous gases may be produced in fire. Use of water on molten or burning titanium may result in explosion.
OSHA Permissible Exposure Limit	ACGIH Threshold Limit Value
15mg/m³ (Total Dust); 5mg/m³ (Resp. Dust) - For Powder or Dust ONLY	10mg/m³ (Total Dust) - For Powder or Dust ONLY
Carcinogens - OSHA, IARC, NTP	Medical Condition Aggravated by Exposure
Not listed as a carcinogen under OSHA, IARC, or NTP.	Powder or dust may aggravate preexisting respiratory conditions.
Potential Health Effects	Potential Environmental Effects
Does not pose health hazards in usual solid form. Hazardous fumes or dust may be generated during welding, cutting, etc.	No Information Available.
Symptoms of Exposure	Target Organs
May cause irritation of respiratory tract, skin, or eyes.	Mucus Membranes (Powder or Dust)
Relevant route(s) of Exposure	
Inhalation	Skin Contact
Low for usual handling.	Low for usual handling.
Ingestion	Eye Contact
Low for usual handling.	Low for usual handling.

While this material is not considered hazardous by the OSHA Hazard Communication Standard, this MSDS contains information critical to safe handling and proper use of this product. This MSDS should be retained and made available for employees and other users of this product.

SECTION III. COMPOSITION/INFORMATION ON INGREDIENTS

Principal Components	C.A.S.#	% by Weight		
Titanium, Ti	7440-32-6	80-95		
Aluminum, Al	7429-90-5	0-8		
Chromium, Cr	7440-47-3	0-18		
Molybdenum, Mo	7439-98-7	0-37		
Silicon, Si	7440-21-3	0-3		
Tin, Sn	7440-31-5	0-8		
Vanadium, V	7440-62-2	0-6		
Zirconium, Zr	7440-67-7	0-5		
Niobium, Nb	7440-67-8	0-5		

Material Safety Data Sheet

Revision Date: 3/9/11
Supersedes Date: 11/2/10

Page 2 of 5

SECTION IV. FIRST AID MEASURES

Inhalation Remove from exposure to fresh air, restore or support breathing as needed. Seek medical assistance.	Skin Contact Flush skin with soap and water for at least 15 minutes, remove contaminated clothing.
Ingestion Do not induce vomiting. Seek medical assistance.	Eye Contact Flush with water for at least 15 minutes. If irritation persists, seek medical assistance.
Note to Physicians Treat systematically and supportively as required.	

SECTION V. FIRE FIGHTING MEASURES

Flammable Properties Product in itself is stable, but may burn if introduced to fire. Fines and particulate matter are flammable and can ignite with ignition source. Poisonous gases are produced in fire. Containers may explode in fire. Fire may reignite after extinguishing. Titanium fires produce significant heat.
Protection of Firefighters Wear self-contained breathing apparatus in pressure-demand, MSHA/NIOSH, and full protective gear. Irritating and highly toxic gases may be generated in fire. High intense heat is produced when exposed to fire.
Suitable Extinguishing Media Use Class D fire extinguisher; table salt; sand; dry ground dolomite; or dry powder extinguishing agents. Do NOT use water directly on fire. Do NOT use carbon dioxide. Do NOT use halogenated extinguisher. Water on molten or burning titanium may result in an explosion.
Special Fire Fighting Procedures Small fires can be smothered with table salt, sand or by use of type D extinguishing material. For large fires, it is advisable to allow the material, if contained, to burn out. If containment is not possible, call 911.
Unsuitable Extinguishing Media DO NOT SPRAY WATER ON BURNING TITANIUM. Water on molten or burning titanium may result in an explosion. Carbon Dioxide is NOT effective as an extinguisher. If moisture is present within burning metal fines an explosion may occur. Personnel should evacuate and not attempt to extinguish the fire.

SECTION VI. ACCIDENTAL RELEASE MEASURES

Personal Precautions Use personal protective equipment recommended in Section VIII and remove all ignition sources.	
Environmental Precautions No information is available in regards to environmental hazards. Dispose of in accordance to local, state, and federal regulations.	Methods for Containment Keep fines from becoming airborne. Do not use compressed air. If titanium fines become airborne, ventilate properly to reduce air density.
Methods for Cleanup Use non-sparking tools. Do not push powder long distances across the floor. Keep in small piles away from each other. Place material into non-sparking or anti-static containers. Use only static-free vacuums for cleaning.	
Other Information Spills of this material do not need to be reported to the National Response Center.	

SECTION VII. HANDLING & STORAGE

Handling Mixing, blending, milling or grinding of dry powder should be performed under argon or helium. Keep away from open flames and other sources of ignition.
Storage Store indoors to maintain product integrity. Store away from excessive heat, welding, grinding, or torching operations. Use non-sparking/anti-static containers, tools, and equipment. Maintain a supply of coarse salt and/or Class D fire extinguisher near the processing and storage areas. Store in a cool, dry, well-ventilated area.

Material Safety Data Sheet

Revision Date: 3/9/11
 Supersedes Date: 11/2/10

SECTION VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

OSHA PEL and ACGIH TLV have been set for titanium powder and dust only. OSHA PEL is 15mg/m³ (Total Dust) and 5 mg/m³ (Respiratory Dust). ACGIH TLV is 10 mg/m³ (Total Dust). Not listed by IARC, NIOSH, NTP, or OSHA.

Engineering Controls

Facility should be equipped with an eyewash and safety shower. Use adequate ventilation if grinding, cutting, welding, etc.

Personal Protective Equipment

Eye/Face Protection

Safety glasses with permanent side shields or goggles. Contact lenses may pose a hazard.

Skin Protection

Leather or puncture resistant gloves. Wear appropriate clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN149. Use NIOSH approved respirator if exposure limits in Section II are exceeded or if irritation or other symptoms are experienced.

General Hygiene Considerations

Wash hands after handling. Wear recommended PPE. Contact lenses may absorb irritants. Avoid transfer of material from hands to mouth while eating, drinking, or smoking.

SECTION IX. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Odor/Odor Threshold	Physical State
Silver/gray metal; Solid	Odorless	Solid
pH	Melting Point	Boiling Point
N/A	~1660°C	>3000°C
Flash Point	Upper Explosive Limit	Lower Explosive Limit
Ingot pieces will not flash. Powder or dust flash 460°C	N/A	N/A
Evaporation Rate	Vapor Pressure	Vapor Density
N/A	Not volatile	N/A
Viscosity	Solubility	Specific Gravity
N/A	Insoluble	~4.5
Auto-Ignition Temperature	Ignition Temperature	Decomposition Temperature
N/A	1200°C (Solid Metal) 480°C (powder/dust).	N/A

SECTION X. STABILITY AND REACTIVITY

Chemical Stability

Stable

Conditions to Avoid

Keep away from sparks and flames, incompatible materials, moisture, and strong oxidants.

Incompatible Materials

Reacts with strong acids, aluminum, halogens, interhalogens, oxygen, chlorinated solvents, carbon dioxide, oxidizing agents, bromine trifluoride, silver fluoride, sodium chlorate, halocarbons, and metal oxides.

Hazardous Decomposition Products

Irritating and toxic fumes and gases, titanium oxide, metallic oxides, and dust.

Possibility of Hazardous Reactions

May react violently with interhalogens, oxidizing agents, strong acids or halogenated compounds. Reactions with incompatible materials may result in irritating or toxic gas.

Material Safety Data Sheet

Revision Date: 3/9/11

Supersedes Date: 11/2/10

Page 4 of 5

SECTION XI. TOXICOLOGY INFORMATION

ACUTE EFFECTS	CHRONIC EFFECTS
Oral May cause irritation of the digestive tract. Poorly absorbed from the alimentary tract.	Carcinogenicity Tumorigenic effects have been observed in experiments with laboratory animals.
Dermal Irritant to skin and mucous membranes.	Mutagenicity Properties have not been thoroughly evaluated.
Inhalation May cause irritation of the respiratory tract. May exacerbate preexisting conditions.	Reproductive Effects Reproductive effects have been observed in experiments with laboratory animals.
Eyes Dust or fines may cause irritation.	Developmental Effects Properties have not been thoroughly evaluated.
Other No other acute effects have been noted.	Sensitization Sensitization is not believed to occur.

SECTION XII. ECOLOGICAL INFORMATION

Ecotoxicity No information was available regarding the toxilological effects on the environment.	Persistence/Degradability No information was available regarding the environmental degradation of this product.
Bioaccumulation/Accumulation No information was available regarding the ability of this product to bioaccumulate.	Mobility in Environmental Media No information was available regarding the mobility of this product in the environment.
Other Adverse Effects No information available.	

SECTION XIII. DISPOSAL CONSIDERATIONS

Disposal Dispose according to local, state, and federal regulations.

SECTION XIV. TRANSPORTATION INFORMATION

Proper Shipping Description 6-4 Titanium Metal, Not a DOT regulated material.
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SECTION XV. REGULATORY INFORMATION

Section 313 Supplier Notification: This product contains the following chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (40 CFR 372): Aluminum (dust/fume) C.A.S. 7429-90-5, Chromium C.A.S. 7440-47-3, and Vanadium (exempt when contained in alloy) C.A.S. 7440-62-2.

In addition to the ingredients listed II, this product contains the following chemicals considered by the State of California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as causing cancer or reproductive toxicity and for which warnings are now required: To the best of our knowledge, this product does not contain materials listed under Proposition 65.

The Comprehensive Environmental Response, Compensation, and Liability Act of 1990, Sec102 (CERCLA) requires that any "release" into the "environment" of these hazardous substances contained in a product in excess of the "reportable quantity" in any 24-hour period must be immediately reported to the National Response Center (800-424-8802). Reporting is not required under certain circumstances such as a federally permitted release or the release of certain metal solid particles with a diameter larger than 100 micrometers: Chromium and Compounds, 0-18% by weight, Reportable Quantity: 5,000lb.

The Superfund Amendments and Reauthorization Act of 1986 (SARA) specifies certain emergency planning and notification requirements if these extremely hazardous substances are present in concentrations of greater than 1% at a facility in amounts greater than the threshold planning quantity: To the best of our knowledge, this product does not contain materials listed as EHS under SARA

Material Safety Data Sheet

Revision Date: 3/9/11

Supersedes Date: 11/2/10

Page 5 of 5

SECTION XV. REGULATORY INFORMATION CONTINUED

If this product is discarded as a waste, it would be identified with the following hazardous waste classification under the Resource Conservation and Recovery Act (RCRA). The act specifies requirements for the management and disposal of hazardous wastes: To the best of our knowledge, this product is not a RCRA regulated material.

Canada - Components on Canadian "Ingredient Disclosure List": Aluminum, elemental; Chromium, elemental; Molybdenum, elemental; Tin, elemental; Vanadium, elemental; and Zirconium, elemental.

DSL/NDSL: Titanium is listed on Canada's DSL List.

WHMIS: Classification B4, B6

Toxic Substances Control Act (TSCA): Components of this product listed on the TSCA Inventory are: Aluminum (C.A.S.# 7429-90-5); Chromium (C.A.S.# 7440-47-3); Molybdenum (CAS#7439-98-7); Silicon (C.A.S.# 7440-21-3); Tin (C.A.S.# 7440-31-5); Titanium (C.A.S.# 7440-32-6); Vanadium (C.A.S.# 7440-62-2); Zirconium (C.A.S.# 7440-67-7); Niobium (C.A.S.# 7440-03-1).

Clean Air Act (CAA): To the best of our knowledge, this product does not contain hazardous air pollutants or Class 1 or Class 2 Ozone depleters as defined by the CAA.

Clean Water Act (CWA): To the best of our knowledge, this product does not contain hazardous substances, priority pollutants, or toxic pollutants as defined by the CWA.

SECTION XVI. ADDITIONAL INFORMATION

The information provided in this document is believed to be accurate, but does not purport to be all inclusive and shall be used for reference purposes only. We make no warranty of merchantability or any other warranty, expressed or implied, with respect to such information and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Global Titanium be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages, howsoever arising, even if Global Titanium has been advised of the possibility of such damages.