



**MATERIAL SAFETY DATA SHEET**  
COMPLIES WITH 29 CFR 1910.1200.  
OSHA HAZARD COMMUNICATION RULE

**DATE OF LAST REVISION: 06-05-02**

---

## CHEMICAL IDENTITY

---

LABEL IDENTITY	<b>TITANIUM METAL</b>
CHEMICAL NAME/SYNONYMS	<b>TITANIUM METAL</b>
FORMULA	<b>Ti</b>
CHEMICAL FAMILY	<b>METALLIC ELEMENT</b>
%: <b>&gt;99</b>	CAS: <b>7440-32-6</b>
	TLV: <b>NE</b>
	OSHA/PEL: <b>NE</b>

---

## PHYSICAL AND CHEMICAL PROPERTIES

---

COLOR, FORM AND ODOR	<b>Silver gray metallic powder, pieces, no odor</b>
BOILING POINT	<b>3287</b>
DENSITY (gm/cc)	<b>4.5</b>
VAPOR PRESSURE @ 20°	<b>Essentially 0</b>
% VOLATILE BY VOLUME (%)	<b>NA</b>
REACTION WITH WATER	<b>None</b>
EVAPORATION RATE (H2O=1)	<b>NA</b>
SOLUBILITY IN WATER	<b>Insoluble</b>
MELTING POINT	<b>1668°C</b>

---

## FIRE AND EXPLOSION HAZARD DATA

---

FLASH POINT	<b>NA</b>
AUTOIGNITION TEMPERATURE (°C)	<b>1200° for solid metal in air 250° for powder</b>
FLAMMABILITY	<b>Non-flammable</b>
EXTINGUISHING MEDIA	<b>Flammable solid in powder form. If involved in fire, do not use water, carbon dioxide or halogenated extinguishers. Use dry chemical extinguishing agents, dry sand or dry ground dolomite,</b>
SPECIAL FIRE FIGHTING PROCEDURES	<b>Use normal firefighting procedures which include wearing NIOSH/MSHA approved self-contained breathing apparatus, flame and chemical resistant clothing; hats, boots and gloves. If without risk, remove material from fire area.</b>
UNUSUAL FIRE & EXPLOSION HAZARDS	<b>Titanium metal powder can burn in the atmosphere of carbon dioxide, nitrogen or air. Water applied to hot titanium may evolve hydrogen, causing an explosion. Fire may reignite after having been extinguished.</b>



## TITANIUM METAL MATERIAL SAFETY DATA SHEET

---

### HEALTH HAZARD INFORMATION

---

ROUTES OF ENTRY: **Ingestion**

EFFECTS OF OVEREXPOSURE (acute and chronic):

INHALATION: **A mild irritant. Classified as a nuisance dust.**

DERMAL/EYE: **A mild irritant to skin and eyes.**

INGESTION: **Relatively non-toxic**

---

CARCINOGENICITY: **None** NTP: **No** IARC MONOGRAPHS: **No** OSHA REGULATE: **No**

---

EMERGENCY FIRST AID PROCEDURES:

INGESTION: **Obtain medical attention.**

INHALATION: **Remove to fresh air. Obtain medical attention**

SKIN CONTACT: **Remove contaminated clothing, flood skin with large amounts of water. If irritation persists seek medical attention.**

EYE CONTACT: **Immediately flush eyes, including under eyelids, with large amounts of water for at least 15 minutes. Call a physician.**

---

### REACTIVITY DATA

---

STABILITY

**Stable**

CONDITIONS CONTRIBUTING TO UNSTABILITY

**None**

INCOMPATIBILITY (MATERIALS TO AVOID)

**Aluminum, bromine trifluoride, carbon black, carbon dioxide, metal carbonates, nitrogen, halocarbons, halogens, metal oxides, metal oxosalts, nitric acid, nitryl fluoride, oxidants, oxygen, silver fluoride, steam, acids, acids, halocarbons, halogens.**

HAZARDOUS DECOMPOSITION PRODUCTS

**Titanium Oxides**

HAZARDOUS POLYMERIZATION

**Will Not Occur**

CONDITIONS TO AVOID

**Incompatibles**

OTHER

**Titanium metal powder can burn in the atmosphere of carbon dioxide, nitrogen or air. Water applied to hot titanium may evolve hydrogen, causing an explosion.**

---

### SAFE HANDLING AND USE

---

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: **Wearing full protective equipment, cover spill with dry sand or vermiculite. Mix well and carefully transfer to a container.**

WASTE DISPOSAL METHOD:

**Consult state, local or federal EPA regulations for proper disposal.**



## TITANIUM METAL MATERIAL SAFETY DATA SHEET

---

### SPECIAL PROTECTIVE INFORMATION

---

RESPIRATORY PROTECTION	<b>High efficiency particle respirator</b>
LOCAL EXHAUST	<b>Laboratory fume hood</b>
MECHANICAL (general)	<b>Adequate for non-dusty work</b>
SPECIAL	<b>NA</b>
OTHER	<b>NA</b>
PROTECTIVE GLOVES	<b>Chemical resistant, impervious, heavy rubber or neoprene</b>
EYE PROTECTION	<b>ANSI approved safety glasses</b>
	<b>OTHER PROTECTIVE EQUIPMENT</b>
	<b>Lab coat and apron, flame and chemical resistant coveralls, eyewash capable of sustained flushing, safety drench shower and hygienic facilities for washing.</b>

---

### SPECIAL PRECAUTIONS

---

#### PRECAUTIONS TO BE TAKEN IN HANDLING/STORAGE:

**Mixing, blending, milling or grinding of dry powder should be performed only under argon or helium. Keep container tightly closed. Store in a cool, dry, well ventilated area. Wash thoroughly after use.**

TRANSPORTATION REQUIREMENTS	DOT CLASS:	<b>Flammable solid</b>
	UN NUMBER:	<b>2546</b>
	IMCO CLASS:	<b>4.2</b>
	OTHER:	<b>----</b>
PRECAUTIONARY LABELING	<b>NONE</b>	

---

THE ABOVE INFORMATION IS ACCURATE TO THE BEST OF OUR KNOWLEDGE. HOWEVER, SINCE DATA, SAFETY STANDARDS AND GOVERNMENT REGULATIONS ARE SUBJECT TO CHANGE THE CONDITIONS OF HANDLING AND USE, OR MISUSE ARE BEYOND OUR CONTROL, **ANGSTROM SCIENCES** MAKE NO WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR THE RELIANCE THEREON. USER SHOULD SATISFY HIMSELF THAT HE HAS ALL CURRENT DATA RELEVANT TO HIS PARTICULAR USE.

NA= NOT APPLICABLE

ND= NO DATA FOUND

NE= NOT ESTABLISHED