Titanium

MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Product Name: Titanium

Formula: Ti

CAS Number: 7440-32-6

II. HAZARDOUS INGREDIENTS

Hazardous Component: Titanium Titanium Powder (dust)

Percent (%): 0-100 0-100

OSHA/PEL: N/E 15 mg/m 3

ACGIH/TLV: N/E 10 mg/m 3

HMIS Ratings (Solid):

Health: 1

Flammability: 0

Reactivity: 0

HMIS Ratings (Powder):

Health: 1

Flammability: 4

Reactivity: 1

III. PHYSICAL DATA

Boiling Point: 3,287 o C

Melting Point: 1,668 o C

Specific Gravity: 4.5 g/cc

Solubility in H 2 O: Insoluble

Appearance and Odor: Dark grey powder or silver-grey metal, no odor.

IV. FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A

Flammable Limits: **Upper**: N/A **Lower**: N/A

Autoignition Temperature: 1200 o C for solid metal in air, 250 o C for powder in air.

Extinguishing Media: Flammable solid in powdered form . If involved in fire, do not use water, carbon dioxide or halogenated extinguishers. Use dry powder extinguishing agents, dry sand or dry ground dolomite.

Special Fire Fighting Procedures: Fire may reignite after having been extinguished. 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.

Unusual Fire and Explosion Hazards: Flammable when exposed to heat or flame. May burn in an atmosphere of carbon dioxide, nitrogen or air. Titanium, in the absence of moisture, burns slowly, but evolves much heat. Water applied to hot titanium may evolve hydrogen, causing an explosion. Titanium powder is a dangerous fire and explosion hazard.

V. HEALTH HAZARD INFORMATION

Effects of Exposure:

To the best of our knowledge the chemical, physical, and toxicological properties of titanium have not been thoroughly investigated and recorded.

Titanium is generally considered to be physiologically inert. There are no reported cases in the literature where titanium as such has caused human intoxication. The dusts of titanium or most titanium compounds such as titanium oxide may be placed in the nuisance category.

Acute Effects:

Inhalation: Prolonged inhalation may cause mild irritation to the lungs and respiratory tract.

Ingestion: Relatively non-toxic, poorly absorbed from the alimentary tract.

Skin: May cause abrasive irritation.

Eyes: Dust or powder may cause irritation.

Chronic Effects:

Inhalation: May cause fibrotic lung changes.

Ingestion: No chronic health effects recorded.

Skin: No chronic health effects recorded.

Eye: No chronic health effects recorded.

Medical Conditions Generally Aggravated by Exposure: Pre-existing respiratory disorders.

Target Organs: Mucous membranes

Carcinogenicity: **NTP**: No **IARC**: No **OSHA**: No

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air, keep warm and quiet, give oxygen if breathing is difficult, and seek medical attention if symptoms persist.

INGESTION: Seek medical attention.

SKIN: Remove contaminated clothing, brush material off skin, wash thoroughly with soap and water. Seek medical attention if symptoms persist.

EYE: Immediately flush eyes, including under eyelids, with large amounts of water for at least 15 minutes. Seek medical attention if symptoms persist.

VI. REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Heat, flame, sources of ignition, moisture. Massive titanium is stable at ordinary temperatures. Titanium is ignitable and may explode if in a finely divided form.

Incompatibility (Material to Avoid): Air, 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.

Hazardous Decomposition Products: Titanium oxide fumes, hydrogen.

Hazardous Polymerization: Will not occur

VII. SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled: Powder/fines: wearing full protective equipment, remove all sources of ignition. Do not use compressed air to clean spill. Use non-sparking tools to clean up. Do not push powder long distances across the floor. Keep in small piles away from each other. Place collected material into non-sparking or anti-static containers (the use of plastic bags is not recommended due to potential for static electricity buildup inside plastic bags). Label containers with proper identification as 'Flammable Solid'.

Waste Disposal Method: In accordance with Local, State and Federal waste disposal regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection: NIOSH approved respirator for dusty conditions. Follow the respirator requirements in 29 CFR 1910.134.

Ventilation: Use process enclosures, local exhaust ventilation or other engineering controls to control airborne levels below recommended exposure limits.

Protective Gloves: Rubber gloves

Eye Protection: Safety glasses with side shields, or goggles when potential exposure exists.

Other Protective Clothing or Equipment: Lab coat and apron, flame and chemical resistant coveralls, eyewash capable of sustained flushing, safety drench shower and hygienic facilities for washing.

IX. SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Mixing, blending, milling or grinding of dry powder should be performed only under argon or helium. Keep powder away from open flames and other sources of ignition. Try to maintain humidity above 50% to prevent electrostatic buildup. Maintain a supply of 'coarse' (rock type) salt and/or 'Class D' (FOR METAL FIRES) fire extinguisher located near processing and storage areas. No smoking in area. Use non-sparking metal tools and equipment. Keep work areas clean and free of waste. Keep container tightly closed. Store in a cool, dry, well-ventilated area. Wash thoroughly after use.

Other Precautions: Titanium and titanium alloy solids are not considered flammable in massive form. However, subsequent machining operations require the use of cutting fluids to reduce the temperature of waste material which might ignite without coolant. Do not allow metallic dust to accumulate. Metallic dust may present a serious fire hazard. Arc and sparks generated when welding or grinding could be a source of ignition

for combustible and flammable materials. Contact lenses may pose a hazard; soft lenses may absorb irritants and concentrate them.

Work Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating and smoking. Do not blow dust off clothing or skin with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and facilities for washing.

TSCA Registered: Yes

DOT Regulations:

Powder:

Hazard Class: 4.2

Identification Number: UN2546

Packing Group: II

Proper Shipping Name: Titanium powder, dry

Sponge:

Hazard Class: 4.1

Identification Number: UN2878

Packing Group: III

Proper Shipping Name: Titanium sponge granules or powder

Solid Forms:

Hazard Class: None

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI shall not be held liable for any damages resulting from handling or from contact with the above product.