

ACCORDING TO US CFR 1910.1200

1. SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING
1.1 Product identifier

Product Name Ti64-63+20
 Synonyms Titanium Alloy Powder, Titanium Aluminium Vanadium Alloy, Titanium-6Al-4V, Ti64.
 Chemical Name Titanium Aluminium Vanadium.
 Product code 35821, 36464, 36696, 38028, 38188, 39864, 40301, 40324. 40325
 CAS No. Mixture.

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

Identified Use(s) For applications in laser-based additive manufacturing technologies (SLS, DMLS and SLM) and cold spray applications.

Uses Advised Against None known.

1.3 Details of the supplier of the safety data sheet

Manufacturer / Supplier Tekna Advanced Materials Inc.
 Company Identification 2895, Industrial Blvd.
 Address of Manufacturer Sherbrooke, QC,
 Canada.
 Postal code J1L 2T9
 Telephone (819) 820-7771
 E-mail sds@tekna.com

1.4 Emergency telephone number

Emergency Phone No. CANUTEC: 1-888-CAN-UTEC (226-8832), 613-996-6666 or *666 on a cell phone

2. SECTION 2: HAZARDS IDENTIFICATION
2.1 Classification of the substance or mixture

US CFR 1910.1200 Flam. Sol. 1: Flammable solid.

2.2 Label elements

US CFR 1910.1200
 Product Name Ti64-63+20

Hazard Pictogram(s)



GHS02

Signal Word(s) Danger.

Hazard Statement(s) H228: Flammable solid.

Precautionary Statement(s)

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P240: Ground/bond container and receiving equipment.
 P241: Use explosion-proof electrical/ventilating/lighting/equipment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection.
 P370+P378: In case of fire: Use table salt, dry sand, or Class D Fire Extinguisher to extinguish.

2.3 Other hazards

Danger of dust explosion. Can form explosive mixture with air.
 Dust may have irritant effect on skin, eyes and air passages.

2.4 Additional Information

None.

3. SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS
3.1 Substances

Not applicable.

3.2 Mixtures

HAZARDOUS INGREDIENT(S)	CAS No.	%W/W	Hazard Statement(s)	Hazard Pictogram(s)
Titanium	7440-32-6	88-100	Flam. Sol. 1; H228	GHS02

Aluminium	7429-90-5	0-7	Flam. Sol. 1; H228 Water-react. 2; H261	GHS02
Vanadium	7440-62-2	0-5	Not classified	

4. SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation	If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
Skin Contact	Wash skin with soap and water.
Eye Contact	Hold eye open and rinse slowly and gently with water for 15-20 minutes.
Ingestion	Wash out mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

None anticipated.

4.3 Indication of any immediate medical attention and special treatment needed

Unlikely to be required but if necessary treat symptomatically.

5. SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing media	In case of fire: Use table salt, dry sand, or Class D Fire Extinguisher to extinguish. Fire may also be isolated and allowed to burn itself out.
Unsuitable extinguishing media	Do not use water, halogenated agents or ABC dry chemical agents.

5.2 Special hazards arising from the substance or mixture

Titanium alloy is flammable powder, when suspended in air can readily be ignited, will propagate flame, and may generate considerable pressure and/or deflagrate. May form explosive dust/air mixtures. Decomposes in a fire giving off toxic fumes: Metal oxides, hydrogen gas.

5.3 Advice for firefighters

Fire fighters should wear complete protective clothing including self-contained breathing apparatus. If the fire is in container, smother with inert gas (Argon/Helium).

6. SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Eliminate sources of ignition. Avoid dust generation. Avoid inhalation of dusts. Wear protective gloves/protective clothing/eye protection/face protection.

6.2 Environmental precautions

Do not allow to enter drains, sewers or watercourses.

6.3 Methods and material for containment and cleaning up

Stop leak if safe to do so. Sweep or shovel-up spillage and remove to a safe place. Use vacuum equipment for collecting spilt materials, where practicable. Avoid the use of compressed air to clean spills or leaks of fine material.

6.4 Reference to other sections

See Also Section 8, 13.

7. SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/equipment. Avoid build-up of dust. Avoid inhalation of dusts. Avoid contact with skin and eyes. Wear protective gloves/protective clothing/eye protection/face protection.

7.2 Conditions for safe storage, including any incompatibilities

Storage temperature	Keep containers in a clean, cool and dry area away from heat sources. Store in a well-ventilated place.
Storage life	Ambient.
Incompatible materials	Stable under normal conditions. Strong oxidizing agents, Acids, Alkaline.

8. SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational Exposure Limits

Occupational Exposure Limits						
SUBSTANCE	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m ³)	STEL (ppm)	STEL (mg/m ³)	Note
Aluminum metal and insoluble compounds	7429-90-5		1			ACGIH TLV, R, A4
Aluminum, metal (as Al) (Total dust)	7429-90-5		15			OSHA PEL Z-1
Aluminum, metal (as Al) (Respirable fraction)	7429-90-5		5			OSHA PEL Z-1
Aluminum pyro powders	7429-90-5		5			OSHA PEL
Aluminum, metal (as Al) (Total dust)	7429-90-5		10			NIOSH REL Z-1
Aluminum, metal (as Al) (Respirable fraction)	7429-90-5		5			NIOSH REL Z-1

Remark	Notes
ACGIH TLV	The American Conference of Governmental Industrial Hygienists (ACGIH®) Threshold Limit Values (TLVs®)
R	Respirable particulate matter
A4	Not Classifiable as a Human Carcinogen
OSHA PEL Z-1	Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) from 29 CFR 1910.1000 Z-1 Table
OSHA PEL	Occupational Safety and Health (OSHA) Permissible Exposure Limits (PELs).
NIOSH REL Z-1	National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs) from the NIOSH Pocket Guide to Chemical Hazards table Z-1: Up to 10-hour time weighted average (TWA) during a 40-hour work week

8.2 Exposure controls

Provide adequate ventilation, including appropriate local extraction.

8.3 Personal protection equipment



Eye Protection

Wear eye/face protection.



Skin protection

Wear suitable protective clothing and gloves.



Respiratory protection

Where engineering controls are not fitted or inadequate wear suitable respiratory protective equipment. A suitable dust mask or dust respirator with filter type P may be appropriate.

Thermal hazards

None known.

9. SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Solid.
	Color: Metallic grey.
Odor	Odorless.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	1660 °C (3260 °F)
Initial boiling point and boiling range	3287 °C (5949 °F)
Flash Point	460 °C (860 °F)
Evaporation rate	Not applicable.
Flammability (solid, gas)	Flammable solid.
Upper/lower flammability or explosive limits	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Density	Not available.
Relative density	4.5 g/cm ³

Solubility(ies)	Solubility (Water): Insoluble. Solubility (Other): Not available.
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	480 °C (896 °F)
Decomposition Temperature	Not available.
Viscosity	Not applicable.
Explosive properties	Can form explosive mixture with air.
Oxidizing properties	Not oxidizing.
9.2 Other information (Data from the -53+20 um size powder, no data available for this size)	
Minimum ignition energy (MIE)	74 mJ (Data from -63+20 um powder)
Dust deflagration index (Kst)	42 bar•m/s
Dust explosive classes	ST 1
Maximum explosion pressure (Pmax)	5.81 barg
Maximum rate of pressure rise ((dP/dt)max)	155
Minimum Explosible Concentration (MEC)	60<MEC<80 g/m ³
Limiting Oxidant Concentration (LOC)	7.5 %O ₂
Minimum Ignition Temperature of a Dust Cloud (MAIT)	750 ° C
Minimum Ignition Temperature of a Dust Layer (MIT)	>450 ° C

10. SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Stable under normal conditions.

10.2 Chemical Stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Danger of dust explosion. Can form explosive mixture with air.

10.4 Conditions to avoid

Keep away from heat and direct sunlight. Avoid contact with moisture.

10.5 Incompatible materials

Strong oxidizing agents, Acids, Alkaline.

10.6 Hazardous decomposition products

No hazardous decomposition products known.

11. SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity - Ingestion	Low acute toxicity.
Acute toxicity - Skin Contact	Low acute toxicity.
Acute toxicity - Inhalation	Low acute toxicity.
Skin corrosion/irritation	Dust may cause irritation.
Serious eye damage/irritation	Dust may cause irritation.
Skin sensitization data	It is not a skin sensitizer.
Respiratory sensitisation data	None anticipated.
Germ cell mutagenicity	There is no evidence of mutagenic potential.
Carcinogenicity	No evidence of carcinogenicity.
Reproductive toxicity	None anticipated.
Lactation	Not classified.
STOT - single exposure	None anticipated.
STOT - repeated exposure	None anticipated.
Aspiration hazard	Not classified.

11.2 Other information

None.

12. SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Toxicity - Aquatic invertebrates	Low toxicity to invertebrates.
Toxicity - Fish	Low toxicity to fish.
Toxicity - Algae	Low toxicity to algae.
Toxicity - Sediment Compartment	Not classified.
Toxicity - Terrestrial Compartment	Not classified.

12.2 Persistence and Degradation

No data.

12.3 Bioaccumulative potential

No data.

12.4 Mobility in soil

Insoluble in water. The product is predicted to have low mobility in soil.

12.5 Other adverse effects

None.

13. SECTION 13: DISPOSAL CONSIDERATIONS
13.1 Waste treatment methods

Dispose of this material and its container as hazardous waste.
 Disposal should be in accordance with local, state or national legislation.

13.2 Additional Information

None.

14. SECTION 14: TRANSPORT INFORMATION
14.1 UN number

UN No. 3089

14.2 UN proper shipping name

UN proper shipping name METAL POWDER, FLAMMABLE, N.O.S.

14.3 Transport hazard class(es)

ADR/RID Class 4.1
 IMDG Class 4.1
 IMDG EMS Not available
 ICAO/IATA
 Excepted Quantities E2
 Passenger and Cargo Aircraft Limited Y441
 Quantities Packing Instructions
 Passenger and Cargo Aircraft Limited 5Kg
 Quantities Max net Qty
 Passenger and Cargo Aircraft Packing 445
 Instructions
 Passenger and Cargo Aircraft Max net 15Kg
 Qty
 Cargo Aircraft Packing Instructions 448
 Cargo Aircraft Max net Qty 50Kg
 Special Provisions A3
 Emergency Response Guidebook (ERG) 3L
 Code
 ADR Classification Code F3
 ADR HIN 40
 ADR Transport Category 2
 Tunnel Restriction Code E
 Emergency Action Code 4Y
 APP Advice on Additional Personal Protection (APP) Not applicable

14.4 Packing group

Packing group II
 Labels 4.1



Special Provisions 552
 Limited Quantities 1 kg
 Excepted Quantities E2
 Mixed Packing Instructions for Packages P002 IBC08
 Special Packing Provisions for Packages B4
 Mixed Packing Instructions for Packages MP11

14.5 Environmental hazards

Environmental hazards Not known.

14.6 Special precautions for user

Special precautions for user Not known.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Packing Instructions for Portable Tanks T3
 Special Provisions for Portable Tanks TP33
 Tank Code for Tanks SGAN
 Special Provisions for Tanks Not applicable
 Vehicle for Tank Carriage AT
 Special Provisions for Carriage - Packages V11
 Special Provisions for Carriage - Bulk Not applicable
 Special Provisions for Carriage - Loading, Unloading and Handling Not applicable
 Special Provisions for Carriage - Operation Not applicable

