Safety Data Sheet

1. IDENTIFICATION OF THE PREPARATION AND OF THE COMPANY/UNDERTAKING

Chemical product name	:	LaserForm® Ti Gr. 1 Type A (Titanium grade 1)
Chemical product detail	:	Commercially pure Titanium

Supplier information (Japan)

Company name	:	3D Systems Japan K.K.
Address	:	Ebisu Garden Place Tower 27F 4-20-3, Ebisu, Shibuya-ku, Tokyo 150-6027 Japan
Phone number	:	03-5798-2500
E-mail address	:	moreinfo@3dsystems.com
Emergency phone number	:	03-4520-9637 – Chemtrec

Manufacturer information

Company name (USA)	:	3D Systems Inc.
Address	:	333 Three D Systems Circle Rock Hill, South Carolina U.S.A.
Phone number	:	803.326.3900 800.793.3669 (Toll free in the U.S.A)
E-mail address	:	moreinfo@3dsystems.com
Emergency phone number	:	800.424.9300 – Chemtrec

Company name (UK)	:	3D Systems Europe LTd.
Address	:	Mark House, Mark Road Hemel Hempstead Herts HP2 7 United Kingdom
Phone number	:	+44 144-2282600
E-mail address	:	moreinfo@3dsystems.com
Emergency phone number	:	703.527.3887 – Chemtrec

Company name (Australia)	:	3D Systems / Australia
Address	:	5 Lynch Street Hawthorn, VIC 3122
Phone number	:	+1 03 9819-4422
E-mail address	:	moreinfo@3dsystems.com
Emergency phone number	:	+(61) 29037.2994 – Aus Chemtrec
Recommended use and restriction on use	:	For use with ProX® 320 printer

2. HAZARDS IDENTIFICATION

GHS Classification

Physicochemical hazards

Explosives	:	Not applicable
Flammable gases (including chemically unstable gases)	:	Not applicable
Aerosols	:	Not applicable
Oxidizing gases	:	Not applicable
Gases under pressure	:	Not applicable
Flammable liquids	:	Not applicable
Flammable solids	:	Category 1
Self-reactive chemicals	:	Not applicable
Pyrophoric liquids	:	Not applicable
Pyrophoric solids	:	Not classified
Self-heating chemicals	:	Classification not possible
Substances and mixtures which, in contact with water, emit flammable gases	:	Not classified
Oxidizing liquids	:	Not applicable
Oxidizing solids	:	Not applicable
Organic peroxides	:	Not applicable
Corrosive to metals	:	Classification not possible

Health hazards

Acute toxicity (oral)	:	Classification not possible
Acute toxicity (dermal)	:	Classification not possible
Acute toxicity (Inhalation: gas)	:	Not applicable
Acute toxicity (Inhalation: vapour)	:	Classification not possible
Acute toxicity (Inhalation: dust, mist)	:	Classification not possible
Skin corrosion/irritation	:	Classification not possible
Serious eye damage/eye irritation	:	Classification not possible
Respiratory/skin sensitization	:	Respiratory sensitization: Classification not possible Skin sensitization: Classification not possible
Germ cell mutagenicity	:	Classification not possible
Carcinogenicity	:	Classification not possible
Reproductive toxicity	:	Classification not possible
Target organ systemic toxicity (Single exposure)	:	Classification not possible
Target organ systemic toxicity (Repeated exposure)	:	Classification not possible
Aspiration hazard	:	Classification not possible

Environmental hazard

Hazard to the aquatic environment (acute)	:	Classification not possible
Hazard to the aquatic environment (long-term)	:	Classification not possible
Hazard to the ozone layer	:	Not applicable

GHS label elements

Pictogram or symbol :

Signal word : Danger

Hazard statements : H228: Flammable solid

Precautionary statements

Safety measures	:	P210: Keep away from heat/sparks/open flames/hot surfaces 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.
Response	:	P370+P378: In case of fire: Use powder extinguisher for metal oxidation fire (sodium hydrogencarbonate salt), dry salt or sand to extinguish.
Storage	:	—
Disposal	:	—
Important symptoms and summary of prospected emergency	:	Dust explosion
Other precautions	:	Handle and store under inert gas.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture : Mixture (metallic alloy)

Chemical/general name : Metallic alloy powder

Composition	CAS No.	Concentration or concentration range	Reference number in gazetted list of Japan
Titanium	7440-32-6	88.5 - 91.5%	Not applicable

4. FIRST AID MEASURES

If inhaled	:	Move affected person to fresh air, rest and keep warm. Support breathing is necessary. In severe cases, if exposure has been great, or if respiratory irritation occurs, obtain medical attention.
If on skin	:	Wash off thoroughly with soap and water. Remove and dispose of or properly launder contaminated clothing before wearing again.
If in eyes	:	Irrigate gently but thoroughly, including under the eyelids, with water for at least 10 to 20 minutes. Obtain medical attention if irritation persists.
If ingested	:	Wash out mouth thoroughly with water.
Most important symptoms and effects, both acute and delayed	:	If inhaled: Mechanical irritation of airways If on skin: No information available If in eyes: Mechanical irritation. If ingested: No information available
Self-protection of the first aider	:	Put on appropriate protective equipment (see section 8). Move exposed person to fresh air.
Indications of any immediate medical attention and special treatment needed	:	If in eyes: Treat symptomatically. If inhaled: Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	The product itself is flammable and can spontaneously ignite when mixed with air. Adapt extinguishing measures to surroundings. Use powder extinguisher for metal oxidation fire (sodium hydrogencarbonate salt), dry salt, sand, vermiculite, or perlite to extinguish. Carbon dioxide is not effective.

Unsuitable extinguishing media	:	Do not use water (explosion hazard) including high volume water jets, Carbon dioxide (Titanium burns in carbon dioxide above 550°C) or Halon.
Specific hazard arising from the chemical	:	Fire hazard is increased if dust clouds were formed.
Special protective equipment for fire-fighters	:	Wear breathing protection in the presence of dust. Wear suitable antistatic garments.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Keep unnecessary personnel away and contact emergency personnel. Wear appropriate protective equipment and clothing. Remove all sources of ignition.
Environmental precautions	:	Take precautions to ensure product does not contaminate ground or enter the sewer or drainage system.
Methods, materials for containment and cleaning up	:	Wear appropriate protective equipment and antistatic clothing. Containment: Use non-sparking antistatic tools and containers. For cleaning up small spillage: Use an explosion proof vacuum with equipment fitted with immersion filtration. For cleaning up large spillage: Solids should be carefully transferred to suitable salvage containers. Any residues should be treated as small spillages.
Prevention of secondary disaster	:	Do not use compressed air. Prevent the formation of dust clouds.

7. HANDLING AND STORAGE

Handling

Engineering measures	:	Handle under inert gas. Work using a suitable extraction/ventilation system. Prevent the formation of dust clouds. Use non-sparking explosion proof tools. Remove all sources of ignition. Wear suitable antistatic garments and respiration protection. Use appropriate containment to avoid environmental hazard.
Contact avoidance (Incompatible materials)	:	Avoid contact with oxidizing substances, strong acids, strong alkalis, halogenated hydrocarbons and other combustible materials.
Hygiene measures	:	Avoid contact with skin and eyes. Do not breathe dust. Do not blow dust off from clothing or skin with compressed air. Use good housekeeping and sanitation practices. Do not smoke nor eat food in work area. Wash hands thoroughly after working with the product, before eating/drinking/smoking, using the lavatory and at the end of the day. Contaminated clothing should be removed and washed before re-use.

Storage

Safety storage condition	:	Store under inert gas in a sealable antistatic container in dry and cool conditions and keep the container closed when not in use. Containers should be stored in a fire proof cabinet or room in a clean, cool and dry environment. Store this product in accordance with Fire Service Act since the product is classified as Category 2, flammable solids (metallic powder).
Safe materials for container	:	Keep in the container supplied, or suitable metal, antistatic plastic or polythene container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit (Titanium)	:	The Japan Society for Occupational Health: 1 mg/m^3 (Respirable dust), 4 mg/m^3 (Total dust as TiO_2) OSHA/PEL (USA): Not established. ACHIG/TLV (USA): 10 mg/m^3 (as TiO_2)
Facility measures	:	Ensure adequate ventilation to maintain exposures below occupational limits. Whenever possible the use of local exhaust explosion proof ventilation or other engineering controls is the preferred method of controlling exposure to airborne dust and fume to meet established occupational exposure limits. Ensure that eyewash stations and safety showers are close to the workstation location. Do not blow dust off from clothing or skin with compressed air. If a dusty work falls within a “dusty work” stipulated in Ordinance on Prevention of Hazards

		Due to Dust, take prevention measures against exposure of dusts stipulated in the ordinance.
Personal protection equipment		
Respiratory protection	:	If ventilation cannot effectively keep dust concentrations below exposure limits, an appropriate certified respiratory protection must be provided. Use a dust mask equipped with the national certificated filter for solid particles of RS1 (replacement type) or DS1 (disposable type), or a more effective performance dust mask.
Hand protection	:	Use impervious nitrile gloves.
Eye protection	:	Wear safety or chemical goggles.
Skin and body protection	:	Use long sleeved antistatic garments and suit and safety shoes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance		
Physical state, appearance	:	Powder
Color	:	Silver/Gray
Odour	:	Odourless
Odour threshold	:	No data available
pH (20°C)	:	Not applicable
Melting point (°C)	:	1675
Boiling point, initial boiling point and boiling range (°C)	:	No data available
Flash point (°C)	:	No data available
Evaporation rate	:	No data available
Combustibility (solid, gas)	:	Combustible
Ignition/Explosion limit,	:	No data available

Lower limit, Upper limit		Fine dust clouds may form explosive mixtures with air.
Vapour pressure (°C)	:	No data available
Vapour density	:	No data available
Density	:	4.5
Bulk density (kg/m^3)		No data available
Solubility	:	No data available
n-Octanol/water partition coefficient	:	No data available
Auto-ignition point (°C)	:	480 (dust clouds)
Decomposition point	:	No data available
Viscosity	:	Not applicable
Oxidizing property	:	No data available
Particle size	:	100% <1mm
Explanation for GHS classification	:	
Pyrophoric solids	:	Product: Not classified This product is classified as “Not classified” based on its auto-ignition point of 480°C. According to the GHS guidance published by the Ministry of health, labour and welfare, if a substance has an auto-ignition point above 70°C, such substance can be classified as “Not classified”.
Self-heating chemicals	:	Product: Not classified This product is classified as “Not classified” based on its auto-ignition point of 480°C. In accordance with the GHS guidance published by the Ministry of health, labour and welfare, if a substance with its auto-combustion point of more than 50°C, it is better not to classify such substance as this hazard.

10. STABILITY AND REACTIVITY

Chemical Stability	:	Stable under recommended handling and storage conditions.
Reactivity	:	Titanium and titanium alloys may be oxidized slowly when exposed to air.
Possibility of hazardous reactions	:	Titanium reacts with halogens of fluorine, bromide, iodine and chlorine at elevated temperatures (> 150°C). Titanium reacts violently with cupric or lead oxide when heated. Titanium powder combined with trichloroethylene or trichlorotrifluoroethane will flash or spark on heavy impact.
Conditions to avoid	:	Prevent formation of dust clouds or accumulation of fines. Avoid static electricity, heat or ignition source.
Incompatible materials	:	Oxidizing agents, strong acids and strong bases, halogenated hydrocarbons and other combustible materials.
Hazardous decomposition products	:	None.

11. TOXICOLOGICAL INFORMATION

Acute toxicity (oral)	:	'Classification not possible' due to lack of data.
Acute toxicity (dermal)	:	'Classification not possible' due to lack of data.
Acute toxicity (Inhalation)	:	'Classification not possible' due to lack of data.. Product as shipped does not present inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.
Skin corrosion/irritation	:	'Classification not possible' due to lack of data. *1)

Serious eye damage/eye irritation	:	'Classification not possible' due to lack of data. *1) Dusts and fumes may irritate eyes by their physical forms.
Respiratory/skin sensitization	:	'Classification not possible' due to lack of data. *1)
Germ cell mutagenicity	:	'Classification not possible' due to lack of data. *1)
Carcinogenicity	:	'Classification not possible' due to lack of data. *1)
Reproductive toxicity	:	'Classification not possible' due to lack of data. *1)
Target organ systemic toxicity (Single exposure)	:	'Classification not possible' due to lack of data. *1) Dusts and fumes may irritate airways.
Target organ systemic toxicity (Repeated exposure)	:	'Classification not possible' due to lack of data. *1)
Aspiration hazard	:	Not applicable

*1) No scientific data is available on the toxicity of titanium. Titanium is considered to be inert, and so this product is also considered to be inert to these hazards.

12. ECOLOGICAL INFORMATION

Ecotoxicity	:	
Aquatic hazard (acute)	:	'Classification not possible' due to lack of data.
Aquatic hazard (long-term)	:	'Classification not possible' due to lack of data.
Persistence and degradability	:	Not readily biodegradable.
Bio-accumulative potential (BCF)	:	No data available.
Mobility in soil	:	No data available.
Hazard to the ozone layer	:	Not applicable. The component of the product is not listed in annex of Montreal Protocol.
Additional information	:	Do not allow this product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.

13. DISPOSAL CONSIDERATIONS

Residual product	:	Do not contaminate sewers, drains, soil or surface waters with this product. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with Waste Management and Public Cleansing Act and local/prefectural regulations.
Contaminated container/packing	:	If there is a risk that dusts are released into a working place from a used container, take measures to prevent from releasing dusts. Dispose of a contaminated container/packing in accordance with Waste Management and Public Cleansing Act and local/prefectural regulations.
Additional information	:	Prior to disposal, consulting your local waste disposal authority or an approved waste disposal firm to ensure regulatory compliance is recommended.

14. TRANSPORT INFORMATION

International regulations

UN number	:	3089
UN proper shipping name	:	METAL POWDER, FLAMMABLE, N.O.S. (Spherical Ti powder <45μm)
UN class	:	4.1 (Combustible solids)
Packing group	:	II
Marine pollutant	:	Not applicable
Transport in bulk according to Annex II of MARPOL73/78 and the IBC code	:	Not applicable

Domestic Japanese regulations		
Land regulations	:	Fire Service Act: Hazardous materials, Category 2, flammable solids (metallic powder). Road law: Restrictable substance of passing through underwater tunnel (metal powder)
Marine transport	:	Ship Safety Act: Combustible substances (UN3089) Act on Port Regulations: Combustible substances (UN3089)
Air regulations	:	Civil Aeronautics Act: Combustible substances (UN3089)
Emergency response guidance No.	:	170
Special safety measures	:	Load the product in a way that does not cause tumbling, falling or damaging. Ensure to take measures to prevent load collapse.

15. REGULATORY INFORMATION

Industrial Safety and Health Act	:	Hazardous Materials, combustible substances (Metal powder)
Ordinance on Prevention of Organic Solvent Poisoning	:	Not applicable
Ordinance on Prevention of	:	Not applicable
Hazards due to Specified Chemical Substances	:	Not applicable
Ordinance on Prevention of Lead Poisoning Ordinance on Prevention of Hazards Due to Dust	:	If a dusty work falls within a “dusty work” stipulated in this ordinance, handle this product in accordance with the ordinance.
Pneumoconiosis Act	:	If a dusty work falls within a “dusty work” stipulated in this Act, handle this product in accordance with the Act.

Poison and Deleterious Substance Control Act	:	Not applicable
PRTR Act	:	Not applicable
Fire Service Act:	:	Hazardous materials, Category 2, flammable solids (metallic powder).
Explosives Control Act	:	Metallic powder with a high risk of dust explosion (Enforcement ordinance, Article 4-1, No.5-2)
High Pressure Gas Safety Act	:	Not applicable
Export Trade Control Order	:	Not applicable
Ship Safety Act	:	Combustible substances
Civil Aeronautics Act	:	Combustible substances
Basic Environment Act	:	Not applicable
Water Pollution Control Act	:	Not applicable
Air Pollution Control Act	:	Not applicable
Soil Contamination Countermeasures Act	:	Not applicable

16. OTHER INFORMATION

Reference:

1) SDS of LaserForm® Ti Gr. 1 Type A, EC version (Revised on Feb. 25, 2016, SDS revision No.: 01-A)
2) Chemical Risk Information Platform (CHRIP),GHS classification conducted by Ministry of Health, Labour and Welfare and Ministry of the Environment, Government of Japan

Classification was performed according to JIS Z7252: 2014. Description was performed according to JIS Z7253: 2012.

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