



Safety Data Sheet
According to Hazard Communication Standard 29 CFR 1910 (USA)
LaserForm® AISi7Mg0,6 Type A
Revision Date: November 24th, 2017

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name: LaserForm® AISi7Mg0,6 Type A
Product type: Solid (Metal alloy powder)

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

Identified uses

For use with 3D Systems DMP (Direct Metal Printing) equipment.

Uses advised against

Any other uses.

1.3 Details of the supplier of the data sheet

3D Systems, Inc.
333 Three D Systems
Circle
Rock Hill, South Carolina
U.S.A.
Phone: 803.326.3900 or
Toll-free Phone:
800.793.3669
e-mail:
moreinfo@3dsystems.com

3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
Herts HP2 7
United Kingdom
Phone: +44 144-2282600
e-mail:
moreinfo@3dsystems.com

3D Systems / Australia
5 Lynch Street
Hawthorn, VIC 3122
+1 03 9819-4422
e-mail:
moreinfo@3dsystems.com

3D Systems Japan K.K.
Ebisu Garden Place Tower
27F
4-20-3, Ebisu, Shibuya-ku,
Tokyo 50-6027 Japan
Telephone No. +81-3-
5798-2500
e-mail:
moreinfo@3dsystems.com

1.4 Emergency telephone number:

USA
Chemical Emergency:
800.424.9300 – Chemtrec

Europe
Chemical Emergency:
+1 703.527.3887
Chemtrec

Australia
Chemical Emergency:
+(61) 29037.2994 – Aus
Chemtrec

Japan
Chemical Emergency
+(81)-345209637
Chemtrec

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of substance or mixture

GHS product definition: Mixture

2.1.1 Classification

Regulation (EC) No. 1272/2008 [CLP/GHS]

No hazardous product as specified in EU-Directive 1272/2008

To our knowledge, this product does not present any particular risk, provided it is handled in accordance with good occupational hygiene and safety practice.

US Hazard Communication Standard 2012 (GHS)

Classified with an OSHA defined hazard: Combustible dust - May form combustible dust concentrations in air.

2.1.2 Additional Information

/

2.2 Label Elements

Hazard pictograms

/

signal word:

GHS-US: Warning

Hazard statements:

HUH210: Safety data sheet available on request

GHS-US: May form combustible dust concentrations in air.

GHS-US: The substance possibly demonstrates unusual reactivity with water under fire exposure conditions.

Precautionary statements:

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P223: Do not allow contact with water.

P260: Do not breathe dust.

P280: Wear protective gloves, clothing and eye protection.



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US Classification System.



NFPA Ratings
 0 = Minimal
 1 = Slight
 2 = Moderate
 3 = Serious
 4 = Severe

Hazardous Materials Identification System (HMIS):

(Degree of hazard: 0 = low, 4 = extreme):

Health **0**
 Flammability **1**
 Physical Hazards **1**

The substance possibly demonstrates unusual reactivity with water under fire exposure conditions. Risk of dust explosion.

2.3 Other Hazards which do not result in classification

Results of PBT and vPvB assessment

- PBT: Not applicable.
- vPvB: Not applicable.

Danger of dust explosion: Dust clouds can be ignited and could pose an explosion risk in a confined space.

Reactivity: Can react with oxidizing agents and in alkaline solutions, causing hydrogen release. Hydrogen gas can ignite spontaneously due to exothermal nature of reaction. Can react violently with halogenated hydrocarbons.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical characterization:

Substance/mixture: Mixture

Chemical name	CAS-No	EC-No	%	Classification according to Reg. (EC) No. 1272/2008 and GHS-US
Aluminum	7429-90-5	231-072-3	>80	Flam. Sol.1, H228 Water react. 2, H261
Silicium	7440-21-3	231-130-8	1-12	Flam. Sol.2, H228

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

See section 16 for the full text of the H statements declared above.

There are no additional ingredients present which within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs or vPvBs or have been assigned a workplace exposure limit and hence require reporting in this section.

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

- **Following eye contact:** Rinse gently but thoroughly, including under the eyelids, with water for at least 10 to 20 minutes. If symptoms persist consult doctor/ ophthalmologist.
- **Following inhalation:** Move the affected person away from the contaminated area and into the fresh air. Give artificial respiration if necessary. If you feel unwell, seek medical advice.
- **Following skin contact:** Generally the product does not irritate the skin. Wash off thoroughly with soap and water. If case of redness or irritation, call a doctor. Remove all contaminated clothing and footwear. Dispose or properly launder contaminated clothing before wearing again.
- **Following ingestion:** Wash out mouth thoroughly with water. Drink 1 to 2 glasses of water. DO NOT INDUCE VOMITING. Seek medical attention if irritation persists.
- **Protection of the first aider:** Put on appropriate protective equipment (see section 8).

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

- **Eye contact:** Mechanical irritation. Dust may cause slight irritation to the ocular mucous membranes due to the presence of a foreign body.



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- **Inhalation:** May cause coughing, asthma symptoms or breathing difficulties if inhaled. Dust from this product may cause irritation to the respiratory tract.
- **Skin Contact:** Mechanical irritation.
- **Ingestion:** Mechanical irritation.

Over-exposure signs/symptoms

- **Eye contact:**
- **Inhalation:**
- **Skin contact:**
- **Ingestion:**

Long term exposure

- Potential immediate effects : Not available.
- Potential delayed effects : Not available.

4.3 Indications of any immediate medical attention and special treatment needed

- **Notes to physician:** Treat symptomatically.
- **Specific treatment:**

SECTION 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media:

- **Suitable extinguishing media:** Use extinguishing type D powder, type D foam, dry salt, alumina or sand if available. Adapt extinguishing measures to surroundings.
- **Unsuitable extinguishing media:** Do not use water (explosion hazard), including high volume water jets, Carbon dioxide, Halon, foam and ABC powder.

5.2 Special hazards arising from the substance or mixture

- **Hazards from the substance or mixture:** The product itself is flammable. Increased fire hazard during dust formation. When dispersed in air the powder is susceptible to dust explosions. Contact with water releases flammable hydrogen gas.
- **Hazardous thermal decomposition products:** May release inert alumina dust.

5.3 Advise for firefighters:

- **Special protective actions for firefighters:** Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Contain the extinguishing fluids by bunding. Do not breathe fumes. Avoid raising powdered material due to explosion hazard.
- **Special protective equipment for firefighters:** Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Wear complete protective clothing.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

- **General measurers:** Avoid formation of dust due to explosion hazard.. Keep away from ignition sources. Keep unnecessary personnel away and contact emergency personnel. Wear appropriate protective equipment and clothing.
- **For non-emergency personnel:** Access forbidden to unauthorised personnel. Only qualified personnel equipped with suitable protective equipment may intervene. Avoid contact with skin and eyes. Do not breathe dust.
- **For emergency responders:** Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2 Environmental precautions

Do not allow product to spread into the environment. Do not discharge into drains or rivers.

6.3 Methods and material for containment and cleaning up

For containment: Use non-sparking antistatic tools and containers

For cleaning up small spillage: Use an explosion proof vacuum cleaner with equipment fitted with immersion filtration. Do not use water or aqueous cleansing agents for cleaning. Contact with water liberates flammable gases.

For cleaning up large spillage: Mechanically recover the product. Avoid dust production. Gather the product and place it in a spare container that has been suitably labeled. Dispose of materials or solid residues at an authorized site. Do not use water for cleaning. Any residues should be treated as small spillages.

Other information: Do not use compressed air. Prevent the formation of dust clouds.



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6.4 Reference to other sections

- See Section 1 for emergency contact information.
- See Section 7 for information on safe handling.
- See section 8 for information on appropriate personal protective equipment.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures:

- **Personel protection:** Work using a suitable extraction/ventilation system. Avoid contact with skin and eyes. Wear suitable antistatic garments and respiration protection.
- **Measures to prevent fire:** Any unavoidable deposit of dust must be regularly removed. Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces. Prevent the formation of dust clouds. Dust can combine with air to form an explosive mixture. Keep ignition sources away. Do not smoke. Protect against electrostatic charges. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Use explosion-proof apparatus / fittings and spark-proof tools. Contact with water releases flammable gases.
- **Measures to protect the environment:** Use appropriate containment to avoid environmental hazard.

Advice on general occupational hygiene:

Do not drink, eat or smoke in the workplace. Avoid contact with skin and eyes. Do not breathe dust. Wash hands and face thoroughly after working with material. Contaminated clothing should be removed and washed before reuse.

7.2 Conditions for safe storage

Local regulations should be followed regarding the storage of this material.

- **Technical measures and storage conditions:** Keep in a well-ventilated room. Keep container dry. Keep the container tightly closed. Keep away from sources of ignition. Avoid the proximity of flammable products (including wood, cardboard ...). Store away from incompatible materials such as water, acids, strong oxidizing agents, Bases, Alkaline earth metals, Alcohols and Metallic oxides.
- **Packaging materials:** Keep in the container supplied, or suitable metal, antistatic plastic or polythene container.
- **Requirements for storage rooms and vessels:** Containers should be stored in a fire proof cabinet or room in a clean, cool and dry environment.

7.3 Specific end use(s)

- **Recommendations:** Not available.
- **Industrial sector specific Solutions:** Not available.



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SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:

Aluminium	
Australia	English Safe Work Australia (Australia, 1/2014). TWA: 10 mg/m ³ 8 hours. Form: Dust TWA: 5 mg/m ³ , (as Al) 8 hours. Form: Welding fume I
Austria	German GKV_MAK (Österreich, 12/2011). MAK - Tagesmittelwert: 10 mg/m ³ 8 Stunden. Form: einatembare Fraktion MAK - Kurzzeitwerte: 20 mg/m ³ , 2 mal pro Schicht, 60 Minuten. Form: einatembare Fraktion MAK - Kurzzeitwerte: 10 mg/m ³ , 2 mal pro Schicht, 60 Minuten. Form: alveolengängiger Anteil MAK - Tagesmittelwert: 5 mg/m ³ 8 Stunden. Form: alveolengängiger Anteil
Belgium	Dutch Lijst Grenswaarden / Valeurs Limites (België, 4/2014). Grenswaarde: 1 mg/m ³ 8 uren. Vorm: inadembare fractie French Lijst Grenswaarden / Valeurs Limites (Belgique, 4/2014). Valeur limite: 1 mg/m ³ 8 heures. Forme: fraction alvéolaire German Lijst Grenswaarden / Valeurs Limites (Belgien, 4/2014). Mittelwert: 1 mg/m ³ 8 Stunden. Form: alveolengängige Fraktion
Brasil	Portuguese ACGIH TLV (Estados Unidos, 4/2014). TWA: 1 mg/m ³ 8 horas. Formulário: Fração respirável
Czech Republic	Czech MZCR PEL/NPK-P (Česká republika, 1/2013). PEL: 10 mg/m ³ 8 hodin. Skupenství: prach
Denmark	Danish Arbejdstilsynet (Danmark, 10/2012). Gennemsnitværdier: 5 mg/m ³ , (beregnet som Al) 8 timer. Form: røg Gennemsnitværdier: 2 mg/m ³ 8 timer. Form: respirabel Gennemsnitværdier: 5 mg/m ³ 8 timer. Form: total DK-Arbejdstilsynet (Danmark, 1997). GV: 10 mg/m ³ Form:
Finland	Finish Työterveyslaitos, Sosiaali- ja terveysministeriö (Suomi, 3/2014) HTP-arvot 8 h: 1.5 mg/m ³ , (laskettuna Al:nä) 8 tuntia. Olomuoto: aerosoli
France	French Ministère du travail (France, 7/2012). VME: 10 mg/m ³ 8 heures. VME: 5 mg/m ³ 8 heures. Forme: fumées VME: 5 mg/m ³ 8 heures. Forme: poudre
Germany	German TRGS900 AGW (Deutschland, 12/2014). Schichtmittelwert: 1.25 mg/m ³ 8 Stunden. Form: alveolengängige Fraktion Kurzzeitwert: 20 mg/m ³ 15 Minuten. Form: einatembare Fraktion Schichtmittelwert: 10 mg/m ³ 8 Stunden. Form: einatembare Fraktion
Hungary	Hungarian 25/2000. (IX. 30.) EüM-SzCsM együttes rendelet (Magyarország, 12/2011). AK: 6 mg/m ³ 8 óra. Forma: respirabilis frakció
Mexico	Spanish NOM-010-STPS (México, 9/2000). LMPE-PPT: 5 mg/m ³ 8 horas. LMPE-PPT: 5 mg/m ³ 8 horas. Estado: polvo



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Aluminium

Norway

Norwegian FOR-2011-12-06-1358 (Norge, 1/2013).

Gjennomsnittsverdier: 5 mg/m³ 8 timer. Form: pyroteknikk

Poland

Polish Rozporządzenie Ministra Pracy i Polityki Społecznej (Dz.U. 2014 poz. 817) (Polska, 6/2014).

NDS: 2.5 mg/m³ 8 godzin. Postać: frakcja wdychalna

NDS: 1.2 mg/m³ 8 godzin. Postać: frakcja respirabilna

Portugal

Portuguese Instituto Português da Qualidade (Portugal, 11/2014).

VLE-MP: 1 mg/m³ 8 horas. Formulário: poeiras

VLE-MP: 5 mg/m³, (expresso em Al) 8 horas. Formulário: pós de pirólise

Spain

Spanish INSHT (España, 1/2014).

VLA-ED: 10 mg/m³, (Al en polvo estabilizado) 8 horas. Forma: polvo

VLA-ED: 5 mg/m³, (como Al) 8 horas. Forma: humos

Sweden

Swedish AFS 2011:18 (Sverige, 12/2011).

NGV: 2 mg/m³, (som Al) 8 timmar. Form: respirabelt damm

NGV: 5 mg/m³, (som Al) 8 timmar. Form: total damm

Switzerland

French SUVA (Suisse, 1/2014).

VME: 10 mg/m³ 8 heures. Forme: Poussières inhalables (poussières totales)

VME: 3 mg/m³ 8 heures. Forme: Poussière respirable (particules)

German SUVA (Schweiz, 1/2014).

MAK-Wert: 10 mg/m³ 8 Stunden. Form: Einatembarer Staub (Gesamtstaub)

MAK-Wert: 3 mg/m³ 8 Stunden. Form: Alveolengängiger Staub (Feinstaub)

Italian SUVA (Svizzera, 1/2014).

TWA: 10 mg/m³ 8 ore. Forma: Frazione inalabile

TWA: 3 mg/m³ 8 ore. Forma: Frazione respirabile

Turkey

Turkish NIOSH REL (Amerika Birleşik Devletleri, 10/2013)

TWA: 5 mg/m³ 10 saatler. Form: Solunabilir kısım

TWA: 10 mg/m³ 10 saatler. Form: Toplam

UK

English EH40/2005 WELs (United Kingdom (UK), 12/2011).

TWA: 10 mg/m³ 8 hours. Form: inhalable dust

TWA: 4 mg/m³ 8 hours. Form: respirable dust

USA

English ACGIH TLV (United States, 4/2014).

TWA: 1 mg/m³ 8 hours. Form: Respirable fraction

OSHA PEL (United States, 2/2013).

TWA: 5 mg/m³, (as Al) 8 hours. Form: Respirable fraction

TWA: 15 mg/m³, (as Al) 8 hours. Form: Total dust

Silicon

Australia

English Safe Work Australia (Australia, 1/2014).

TWA: 10 mg/m³ 8 hours.

Belgium

Dutch Lijst Grenswaarden / Valeurs Limites (België, 4/2014).

Grenswaarde: 10 mg/m³ 8 uren.

French Lijst Grenswaarden / Valeurs Limites (Belgique, 4/2014).

Valeur limite: 10 mg/m³ 8 heures.

German Lijst Grenswaarden / Valeurs Limites (Belgien, 4/2014).

Mittelwert: 10 mg/m³ 8 Stunden.



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Silicon	
Croatia	Croatian MinGoRP GVI/KGVI (Hrvatska, 6/2013). GVI: 4 mg/m ³ 8 sati. Oblik: respirabilna frakcija GVI: 10 mg/m ³ 8 sati. Oblik: ukupna prašina
Denmark	Danish Arbejdstilsynet (Danmark, 10/2012). Gennemsnitværdier: 10 mg/m ³ 8 timer DK-Arbejdstilsynet (Danmark, 1997). GV: 10 mg/m ³ Form:
France	French Ministère du travail (France, 7/2012). VME: 10 mg/m ³ 8 heures. Forme: poussière
Mexico	Spanish NOM-010-STPS (México, 9/2000). LMPE-CT: 20 mg/m ³ 15 minutos. LMPE-PPT: 10 mg/m ³ 8 horas.
Norway	Norwegian FOR-2011-12-06-1358 (Norge, 1/2013). Gjennomsnittsverdier: 10 mg/m ³ 8 timer
Switzerland	French SUVA (Suisse, 1/2014). VME: 10 mg/m ³ 8 heures. Forme: Poussières inhalables (poussières totales) German SUVA (Schweiz, 1/2014). MAK-Wert: 10 mg/m ³ 8 Stunden. Form: Einatembarer Staub (Gesamtstaub) MAK-Wert: 3 mg/m ³ 8 Stunden. Form: Alveolengängiger Staub (Feinstaub) Italian SUVA (Svizzera, 1/2014). TWA: 10 mg/m ³ 8 ore. Forma: Frazione inalabile TWA: 3 mg/m ³ 8 ore. Forma: Frazione respirabile
Turkey	Turkish NIOSH REL (Amerika Birleşik Devletleri, 10/2013) TWA: 5 mg/m ³ 10 saatler. Form: Solunabilir kısım TWA: 10 mg/m ³ 10 saatler. Form: Toplam
UK	English EH40/2005 WELs (United Kingdom (UK), 12/2011). TWA: 10 mg/m ³ 8 hours. Form: inhalable dust TWA: 4 mg/m ³ 8 hours. Form: respirable dust
USA	English OSHA PEL (United States, 2/2013) TWA: 5 mg/m ³ 8 hours. Form: Respirable fraction TWA: 15 mg/m ³ 8 hours. Form: Total dust

Information on Monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Technical measures to prevent exposure

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. Do not blow dust off clothing or skin with compressed air.



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8.2.2 Personal Protection equipment

8.2.2.1 Hygiene measures

Do not use tobacco or food in work area. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

8.2.2.2 Eye and face protection

Safety glasses or goggles are recommended when handling this material.

8.2.2.3 Skin protection

Hand Protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. Rubber or other appropriate gloves should be worn to minimize contact. For hygienic reasons rubber gloves should not be worn for more than 2 hours.

Other skin protection

Use long sleeved antistatic garments and closed, antistatic safety shoes. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

8.2.2.4 Respiratory protection

If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided. Use a dust mask or filter apparatus of minimal level FFP1.



8.2.2 Environmental exposure control

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels. Do not allow product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state:	Powder
Colour:	Silver/Gray
Odour:	Odourless
pH (20 °C):	Not Applicable
Melting point/range (°C):	550 – 660 (1058 - 1220°F)
Boiling point/range (°C):	2467 (4472°F) (for pure Aluminium)
Flash point (°C):	No Data
Ignition temperature (°C):	>500 (>932°F)
Vapour pressure (°C):	No Data
Density (g/cm3):	2.5 - 2.7 (20.863 - 22.53 lbs/gal)
Bulk density (g/cm3):	0.7 – 1.5 (5.84 - 12.52 lbs/gal)
Water solubility (20°C in g/l):	Insoluble
Viscosity:	Not Applicable
Auto-ignition temperature (°C):	Product is not self-igniting
Minimum Ignition Energy (mJ):	10 – 100 mJ (for pure fine Aluminium powder)
Decomposition temperature:	No Data
Dust explosion hazard:	Fine dust clouds may form explosive mixtures with air
Lower explosion limit (g/m³):	30 – 170 () (for pure fine Aluminium powder)



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Upper explosion limit: No Data
Oxidising properties: No Data
Particle size: 100% <1mm

9.2 Other information

No additional information.

SECTION 10. STABILITY AND REACTIVITY

10.1 Chemical Stability: Stable under normal conditions and under recommended storage conditions. Aluminium and aluminium alloys may oxidize slowly when exposed to air.

10.2 Reactivity: Stable under normal conditions and under recommended storage conditions.

10.3 Possibility of hazardous reactions: Contact with water releases flammable gasses (hydrogen). Will react exothermally if mixed with strong oxidising substance and ignited. Susceptible to dust explosions.

10.4 Conditions to avoid: Prevent formation of dust clouds and accumulation of fines. Static electricity, heat or ignition source.

10.5 Incompatible materials: water, alcohols, amines, alkalis, oxidizing agents, strong acids and strong bases, halogenated hydrocarbons and other combustible materials.

10.6 Hazardous decomposition products: vapour, flammable gas (Hydrogen).

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Conclusion/Summary : Not Available

Aluminium (7429-96-5):

Route of Exposure	Measure	Value
Oral Inhalative	LD50	>2000 mg/kg (rat)
Oral Inhalative	LC50/4 h	>0.888 mg/l (rat)

Irritation/Corrosion

Conclusion/Summary : May be irritating to eyes, skin and respiratory system

Sensitisation

Conclusion/Summary : Not available

Mutagenicity

Conclusion/Summary : Not available

Carcinogenicity

Conclusion/Summary : Not available

US organization:

IARC (International Agency for Research on Cancer) : None of the ingredients is listed.

NTP (National Toxicology Program) : None of the ingredients is listed.

OSHA-Ca (Occupational Safety & Health Administration) : None of the ingredients is listed.

Reproductive toxicity

Conclusion/Summary : Not available

Teratogenicity

Conclusion/Summary : Not available

Specific target organ toxicity (single exposure)

Conclusion/Summary : Not available

Specific target organ toxicity (repeated exposure):

Conclusion/Summary : Not available

Aluminium (7429-96-5):

Route of Exposure	Measure	Value
Oral Inhalative	NOAEC	10 mg/m ³ (rat)



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Aspiration hazard

Conclusion/Summary : Not available

11.2 Information on the likely routes of exposure

Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

11.3 Symptoms related to the physical, chemical and toxicological characteristics

Adverse symptoms may include the following

Eye contact : Dust may cause slight irritation to the ocular mucous membranes due to mechanical action.

Inhalation : Coughing. Dust from this product may cause irritation to the respiratory tract.

11.4 Delayed and immediate after short- and long-term exposure

11.4.1 Short term exposure

Potential immediate effects : Not available

Potential delayed effects : Not available

11.4.2 Long term exposure

Potential immediate effects : Not available

Potential delayed effects : Not available

11.5 Potential acute and chronic health effects

11.5.1 Potential acute health effects

Eye contact : No known significant effects or critical hazards

Inhalation : No known significant effects or critical hazards

Skin contact : No known significant effects or critical hazards

Ingestion : No known significant effects or critical hazards

11.5.2 Potential chronic health effects

Conclusion/Summary : No known significant effects or critical hazards

General : No known significant effects or critical hazards

Carcinogenicity : No known significant effects or critical hazards

Mutagenicity : No known significant effects or critical hazards

Teratogenicity : No known significant effects or critical hazards

Developmental effects : No known significant effects or critical hazards

Fertility effects : No known significant effects or critical hazards

SECTION 12. Ecological information

Presents no particular risk to the environment, provided the disposal requirements (see section 13) and national or local regulations are complied with.

12.1 Toxicity

Long-term Ecotoxicity : No data available

12.2 Persistence and degradability

Abiotic Degradation : No data available

Physical-and photo-chemical elimination : No data available

Biodegradation : Not readily biodegradable.

12.3 Bioaccumulative potential

Bioconcentration factor (BCF) : No data available

12.4 Mobility in soil

Soil/water partition coefficient (Koc) : Not available

Mobility : Not available

General note: Do not allow product to reach ground water, water course or sewage system.

12.5 Results of PBT and vPvB assessment

PBT : Not applicable

vPvB : Not applicable

12.6 Other adverse effects

Effect on global warming : No known significant effects or critical hazards

GWPmix comment : No known significant effects or critical hazards

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods



Safety Data Sheet

According to Hazard Communication Standard 29 CFR 1910 (USA)
LaserForm® AISi7Mg0,6 Type A
Revision Date: November 24th, 2017

13.1.1 Product

Methods of disposal

Do not contaminate sewers, drains, soil or surface waters with this material. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with all local, state, and federal regulations. Must not be disposed together with household garbage.

Hazardous waste

The classification of the product may meet the criteria for a hazardous waste.

13.1.2 Packaging

Methods of disposal

Consult local and national guidelines for the disposal of discarded packaging.

13.2 Special precautions

This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14. TRANSPORT INFORMATION

UN Number	This product was tested according to UN-Regulations of transportation of dangerous goods (Orange Book) and ADR-Regulations and was classified as harmless.
UN proper shipping name	Not applicable
Transport hazard class(es)	Not applicable
Packing group	Not applicable
Label	Not applicable
Environmental hazards	Not applicable
Special precautions for user	Prevent moisture and contact with water, heat sources and sources of ignition
Transport in bulk according to Annex II of MARPOL73/78 and the IPBC code	Not applicable

SECTION 15. REGULATORY INFORMATION

EU regulations

EINEC/ELINCS/NLP: All materials are listed
REACH Annex XVII: None listed
Other guidelines: Falls under the ATEX guidelines

US Federal Regulations

Aluminium alloy atomized granules

SARA Section 311/312 Hazard Classes: Physical hazard - Combustible dust

Aluminum (7429-90-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory
Subject to reporting requirements of United States SARA Section 313

Silicon (7440-21-3)

Listed on the United States TSCA (Toxic Substances Control Act) inventory
Not subject to reporting requirements of the United States SARA Section 313

NFPA rating

Health	:0 Minimal Hazard - No significant risk to health
Flammability	:1 Slight Hazard - Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200F. (Class IIIB)
Reactivity	:1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

US State Regulations

Aluminium alloy atomized granules

U.S. - California - Proposition 65 - Other information:

This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

Australian regulations

SUSDP, Industrial Chemicals Act 1989:

Australian Inventory of Chemical Substances, AICS: Listed

Canada



Safety Data Sheet
According to Hazard Communication Standard 29 CFR 1910 (USA)
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Aluminum (7429-90-5)

Listed on the Canadian DSL (Domestic Substances List)

Silicon (7440-21-3)

Listed on the Canadian DSL (Domestic Substances List)

SECTION 16. OTHER INFORMATION

Abbreviations and acronyms

CLP	= Classification, Labelling and Packaging Regulation [Regulation (EC) No.1272/2008]
EUH statement	= CLP-specific Hazard statement
ICAO	= International Civil Aviation Organisation
ADR:	= Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
GHS	= Globally Harmonised System of Classification and Labelling of Chemicals
CAS	= Chemical Abstracts Service (division of the American Chemical Society)
LC50	= Lethal concentration, 50 percent
LD50	= Lethal dose, 50 percent
PBT	= Persistent, Bioaccumulative and Toxic
vPvB	= very Persistent and very Bioaccumulative
STOT RE	= Specific target organ toxicity (repeated exposure)

Full text of abbreviated H statements

H228	: Flammable solid
H261	: In contact with water releases flammable gas

Relevant Precautionary statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

- P202: Do not handle until all safety precautions have been read and understood.
- P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P223: Do not allow contact with water.
- P260: Do not breathe dust.
- P280: Wear protective gloves, clothing and eye protection.

SDS information

Creation date	: November 24 th , 2017
Revision	: 00-A
Revision date	: /
Revision changes	: /

Notice to reader

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Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® AlSi10Mg Type A

Revision Date: February 7th, 2017

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

1.1 Identification of the mixture: Aluminium alloy; Aluminium-silicon alloy; AlSi10Mg

1.2 Type: AlSi10Mg alloy

1.3 Use of the preparation: For use with ProX® DMP 320 printers

1.4 Uses advised against: No data

1.5 Company/undertaking identification:

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U.S.A.
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Toll-free Phone: 800.793.3669
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Tokyo 50-6027 Japan
Telephone No. +81-3-5798-
2500
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Chemical Emergency
+(81)-345209637 – Chemtrec

2. HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification (29 CFR 1910.1200) :

Regulation (EC) No. 1272/2008, HazCom 29 CFD 1910:

Substances which, in contact with water, emit flammable gases	Category 3	H261
---	------------	------

Regulation (EC) 67/548/EEC and 1999/45/EC:

F, R11, R15

2.2 Label Elements

Regulation (EC) No. 1272/2008:

Hazard pictograms and signal word:



GHS02

Signal word:

Warning



GHS08

Signal word:

Warning

Hazard determining components of labelling: Aluminium, Silicium, Magnesium

Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® AlSi10Mg Type A

Revision Date: February 7th, 2017

Hazard statements:

H228: Flammable solid.

H261: In contact with water releases flammable gas

H334: May cause asthma symptoms or breathing difficulties if inhaled

H373: May cause damage to organs through prolonged or repeated exposure

Precautionary statements:

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P223: Do not allow contact with water.

P231+232: Handle under inert gas. Protect from moisture.

P240: Ground/bond container and receiving equipment.

P241: Use explosion-proof electrical and ventilating equipment.

P260: Do not breathe dust.

P280: Wear protective gloves, clothing and eye protection.

P284: [In case of inadequate ventilation] wear respiratory protection.

P304+340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P314: Get medical advice/attention if you feel unwell.

P370+378: In case of fire: Use dry sand or Class D fire extinguisher to extinguish.

P402+404: Store in a dry place. Store in a closed container.

P422: Store contents under inert gas.

Other dangers:

Danger of dust explosion: Dust clouds can be ignited and could pose an explosion risk in a confined space.

Reactivity: Can react with oxidizing agents and in alkaline solutions, causing hydrogen release. Hydrogen gas can ignite spontaneously due to exothermal nature of reaction – Explosion risk.

Reactivity: Can react violently with halogenated hydrocarbons.

NFPA rating



NFPA Ratings

0 = Minimal

1 = Slight

2 = Moderate

3 = Serious

4 = Severe

Hazardous Materials Identification System (HMIS):

(Degree of hazard: 0 = low, 4 = extreme):

Health 1

Flammability 2

Physical Hazards 1

Personal Protection:

Skin, eye protection

Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® AlSi10Mg Type A

Revision Date: February 7th, 2017

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical characterization:

Description: Metallic alloy powder

3.2 Dangerous components:

Chemical name	CAS-No	EC-No	%	Classification	
				Regulation 67/548/EEG or 1999/45/EG	Regulation (EC) No. 1272/2008
Aluminum	7429-90-5	231-072-3	88-91	F R11, R15	Flam. Sol.1, H228 Water react. 2, H261
Silicium	7440-21-3	231-130-8	9-11	R11	Flam. Sol.2, H228
Magnesium	7439-95-4	231-104-6	0.2-0.5	F R15, R17	Pyr. Sol.1, H250 Self. Heat. 2, H252 Water react. 1, H261

4. FIRST AID MEASURES

4.1 General Information: Ensure that eyewash stations and safety showers are close to the workstation location.

4.2 Description of First Aid Measures

Skin contact: Wash off thoroughly with soap and water. Remove and dispose of or properly launder contaminated clothing before wearing again.

Eye contact: Irrigate gently but thoroughly, including under the eyelids, with water for at least 10 to 20 minutes. Obtain medical attention if irritation persists.

Inhalation: 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.

Ingestion: Wash out mouth thoroughly with water. Drink 1 to 2 glasses of water. DO NOT INDUCE VOMITING. Seek medical attention if irritation persists.

4.3 Most important symptoms and effects, both acute and delayed

Skin Contact: Mechanical irritation.

Eye Contact: Mechanical irritation.

Inhalation: Mechanical irritation of airways. May cause asthma symptoms or breathing difficulties if inhaled.

Ingestion: Mechanical irritation.

4.4 Indications of any immediate medical attention and special treatment needed

Eye Contact: Treat symptomatically

Inhalation: Treat symptomatically

4.5 Self-protection of the first aider: Put on appropriate protective equipment (see section 8). Move exposed person to fresh air.

Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® AlSi10Mg Type A

Revision Date: February 7th, 2017

5. FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media: The product itself is flammable. When dispersed in air the powder is susceptible to dust explosions. Adapt extinguishing measures to surroundings. Use extinguishing type D powder, type D foam, dry salt or sand if available. Carbon dioxide is not effective.

5.2 Extinguishing media which must not be used for safety reasons: Do not use water (explosion hazard), including high volume water jets, Carbon dioxide or Halon.

5.3 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases: increased fire hazard during dust formation. Contact with water releases flammable hydrogen gas.

5.4 Special protective equipment for fire-fighters: Wear breathing protection in the presence of dust and suitable antistatic garments.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions: Keep unnecessary personnel away and contact emergency personnel. Wear appropriate protective equipment and clothing. Remove all sources of ignition. Avoid dust formation.

6.2 Environmental precautions: Take precautions to ensure product does not contaminate ground or enter the sewer or drainage system.

6.3 Methods for cleaning up:

Wear appropriate protective equipment and antistatic clothing.

For 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.
Other information:	Do not use compressed air. Prevent the formation of dust clouds.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures:	Work using a suitable extraction/ventilation system. Use non-sparking explosion proof tools. Wear suitable antistatic garments and respiration protection.
Measures to prevent fire:	Prevent the formation of dust clouds. Avoid all sources of ignition.
Measures to protect the environment:	Use appropriate containment to avoid environmental hazard.
Advice on general occupational hygiene:	Avoid contact with skin and eyes. Do not breathe dust. Wash hands and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use.

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WHS Regulations Australia,
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7.2 Conditions for safe storage

Technical measures and storage conditions:	Store under inert gas in a sealed antistatic container in dry and cool conditions and keep the container closed when not in use.
Packaging materials:	Keep in the container supplied, or suitable metal, antistatic plastic or polythene container.
Requirements for storage rooms and vessels:	Containers should be stored in a fire proof cabinet or room in a clean, cool and dry environment.
Keep away from water or moisture.	
Storage class:	Class 4.3 (Releases flammable gas when wet)
Further information on storage conditions:	Local regulations should be followed regarding the storage of this material.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:

Exposure limits	OSHA/PEL	ACGIH/TLV
Aluminium	No limit	5 mg/m ³ (Fumes)
Silicium	15/ 5 mg/m ³ (total/respiratory)	0.3 mg/m ³ (as SiO ₂)
Magnesium	No limit	No limit

8.2 Exposure controls

Technical measures to prevent exposure:

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. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

Instructional measures to prevent exposure:

Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Wash hands after handling and before eating, smoking and using the lavatory and at the end of the day.

Personal protection equipment:

Respiratory protection: If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided. Use a dust mask or filter apparatus of minimal level FFP1.

Hand protection: Use impervious nitrile gloves.

Eye protection: Wear safety glasses or chemical goggles.

Body protection: Use long sleeved antistatic garments and closed, antistatic safety shoes.

Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® AlSi10Mg Type A

Revision Date: February 7th, 2017



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state: Powder

Colour: Silver/Gray

Odour: Odourless

9.2 Important health, safety and environmental information

pH (20 °C):	NA
Melting point/range (°C):	570 - 660
Boiling point/range (°C):	No Data
Flash point (°C):	No Data
Ignition temperature (°C):	>500°C
Vapour pressure (°C):	No Data
Density (g/cm³):	2.5 - 2.7
Bulk density (kg/m³):	0.7 - 1.5
Water solubility (20°C in g/l):	Insoluble
Viscosity:	NA
Auto-ignition temperature (°C):	Product is not self-igniting
Decomposition temperature:	No Data
Dust explosion hazard:	Fine dust clouds may form explosive mixtures with air
Lower explosion limit (g/m³):	30
Upper explosion limit:	No Data
Oxidising properties	No Data
Particle size	100% <1mm

10. STABILITY AND REACTIVITY

10.1 Chemical Stability: Stable under normal conditions and under recommended storage conditions. Aluminium and aluminium alloys may oxidize slowly when exposed to air.

10.2 Reactivity: Stable under normal conditions and under recommended storage conditions.

10.3 Possibility of hazardous reactions: Contact with water releases flammable gasses (hydrogen). Will react exothermally if mixed with strong oxidising substance and ignited. Susceptible to dust explosions.

10.4 Conditions to avoid: Prevent formation of dust clouds and accumulation of fines. Static electricity, heat or ignition source.

10.5 Incompatible materials: water, alcohols, amines, alkalis, oxidizing agents, strong acids and strong bases, halogenated hydrocarbons and other combustible materials.

10.6 Hazardous decomposition products: vapour, flammable gas (Hydrogen).

Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® AlSi10Mg Type A

Revision Date: February 7th, 2017

11. TOXICOLOGICAL INFORMATION

11.1 Likely Routes of Exposure:

Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

11.2 Symptoms of Exposure:

Fines/dusts may irritate airways and eyes.

11.3 Acute and chronic effects:

Aluminium: No scientific data is available on the toxicity of aluminum. Aluminum is considered to be relatively inert. This product is also not considered to be mutagenic, teratogenic or carcinogenic.

Silicium: No scientific data is available on the toxicity of silicium. This product is also not considered to be mutagenic, teratogenic or carcinogenic. Oral LD50 Rat: 3160 mg/kg

Magnesium: No scientific data is available on the toxicity of magnesium. There is no know limit for allowable daily magnesium intake. This product is also not considered to be mutagenic, teratogenic or carcinogenic.

Acute Toxicity: No data available

12. Ecological information

12.1 Toxicity

Long-term Ecotoxicity No data available

12.2 Persistence and degradability

Abiotic Degradation No data available

Physical-and photo-chemical elimination No data available

Biodegradation Not readily biodegradable.

12.3 Biocumulative potential

Bioconcentration factor (BCF) No data available

12.4 Mobility in soil

Known or predicted distribution to environmental compartments No data available

Adsorption/Desorption No data available

12.5 Additional information

Do not allow product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.

Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® AlSi10Mg Type A

Revision Date: February 7th, 2017

13. DISPOSAL CONSIDERATIONS

13.1 Appropriate disposal / Product: Do not contaminate sewers, drains, soil or surface waters with this material. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with all local, state, and federal regulations.

13.2 Packaging disposal: Consult local and national guidelines for the disposal of discarded packaging.

13.3 Additional information: Prior to disposal 3D Systems recommends consulting your local waste disposal authority or an approved waste disposal firm to ensure regulatory compliance.

14. TRANSPORT INFORMATION

UN Number	Not applicable
UN proper shipping name	Not applicable
Transport hazard class(es)	Not applicable
Packing group	Not applicable
Label	Not applicable
Environmental hazards	Not applicable
Special precautions for user	Prevent moisture and contact with water, heat sources and sources of ignition
Transport in bulk according to Annex II of MARPOL73/78 and the IPBC code	Not applicable

15. REGULATORY INFORMATION

15.1 EU regulations

EINEC/ELINCS/NLP: All materials are listed
REACH Annex XVII: None listed
Other guidelines: Falls under the ATEX guidelines

15.2 National EU regulations

Not applicable

15.3 US FEDERAL

TSCA: All materials are listed on the TSCA Inventory or are not subject to TSCA requirements
SARA 302 EHS List (40 CFR 355 Appendix A): None listed
SARA 313 (40 CFR 372.65): None listed
CERCLA (40 CFR 302.4): None listed

15.4 Australian regulations

SUSDP, Industrial Chemicals Act 1989:
Australian Inventory of Chemical Substances, AICS: Listed

Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® AlSi10Mg Type A

Revision Date: February 7th, 2017

15.5 Japanese regulations

Industrial Health and Safety Law	Dangerous substances (Combustible substances: Aluminium powder)
Hazardous material	not applicable
Organic solvent poison prevention rule	not applicable
Ordinance on prevention of hazard due to specified chemical substances	not applicable
Lead Poisoning Prevention Rule	not applicable
Poison and Deleterious Substance Control law	not applicable
Management law (PRTR Law)	not applicable
Fire Services Act	flammable solid
Explosives Law	explosive dust
High pressure gas safety law	not applicable
Export Trade Control Order	not applicable
Ship Safety Act:	Combustible material, pyrophoric substance
Aviation Law:	Transport ban, combustible material, pyrophoric substance (194-1)
Waste Disposal and Public Cleaning Law operative to ensure regulatory compliance	Before disposal, consult an approved waste disposal

16. OTHER INFORMATION

16.1 Relevant Hazard Statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

Flam. Sol.1, H228- Flammable solid, category 1, H228: Flammable solid
Flam. Sol.2, H228- Flammable solid, category 2, H228: Flammable solid
Pyr. Sol.1, H250 – Pyrophoric solid, category 1, H250: Catches fire spontaneously if exposed to air
Self. Heat. 2, H252 – Self-heating solid, category 2, H252: Self-heating in large quantities; may catch fire
Water react. 2, H261- Emission of flammable gases in contact with water, category 2, H261: In contact with water releases flammable gas
Water react. 3, H261- Emission of flammable gases in contact with water, category 3, H261: In contact with water releases flammable gas
H334: May cause asthma symptoms or breathing difficulties if inhaled
H373: May cause damage to organs through prolonged or repeated exposure

Relevant Precautionary statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P223: Do not allow contact with water.
P231+232: Handle under inert gas. Protect from moisture.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical and ventilating equipment.
P260: Do not breathe dust.
P280: Wear protective gloves, clothing and eye protection.
P284: [In case of inadequate ventilation] wear respiratory protection.
P304+340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P314: Get medical advice/attention if you feel unwell.
P370+378: In case of fire: Use dry sand or Class D fire extinguisher to extinguish.
P402+404: Store in a dry place. Store in a closed container.
P422: Store contents under inert gas.

Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® AlSi10Mg Type A

Revision Date: February 7th, 2017

Relevant other dangers referred to in sections 2 and 3:

Danger of dust explosion: Dust clouds can be ignited and could pose an explosion risk in a confined space.

Reactivity: Can react with oxidizing agents and in alkaline solutions, causing hydrogen release. Hydrogen gas can ignite spontaneously due to exothermal nature of reaction – Explosion risk.

Reactivity: Can react violently with halogenated hydrocarbons.

Relevant R-Phrases (number and full text) referred to in sections 2 and 3:

F, R11, R15, R17

F : Highly Flammable

R11 : Highly flammable

R15 : Contact with water liberates extremely flammable gases

R17: Spontaneously flammable in air.

16.2 Further information:

SDS Creation Date:..... March 14th, 2016

SDS Revision #:00-C

SDS Revision Date:..... February 7th, 2017

Reason for Revision: Updated part number / updated header / updated danger class in accordance to latest safety testing results

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+44 144-2282600 (Europe GMT+01:00; Mon – Fri, 08:00 a.m. - 17:00 p.m. MEZ)

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Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® CoCr F75 Type A

Revision Date: July 27th, 2016

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

1.1 Identification of the mixture: Cobalt Alloy

1.2 Type: ASTM F75 CoCr alloy

Contains the following substances with hazardous properties: Cobalt

1.3 Use of the preparation: For use with ProX® DMP 320 printers

1.4 Uses advised against: No information

1.5 Company/undertaking identification:

3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina U.S.A.
Phone: 803.326.3900 or
Toll-free Phone: 800.793.3669
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
800.424.9300 – Chemtrec

3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
Herts HP2 7 United Kingdom
Phone: +44 144-2282600
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
703.527.3887 - Chemtrec

3D Systems / Australia
5 Lynch Street
Hawthorn, VIC 3122
+1 03 9819-4422
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
+(61) 29037.2994 – Aus Chemtrec

2. HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification (29 CFR 1910.1200):

Regulation (EC) No. 1272/2008, HazCom 29 CFD 1910:

Skin Sensitization	Category 1	H317
Eye irritant	Category 2	H319
Respiratory sensitization	Category 1	H334
Carcinogenic	Category 1	H350
Reproductive toxicant	Category 2	H361fd
Specific target organ toxicity-repeated exposure	Category 1	H372
Aquatic environment - acute hazard	Category 1	H400
Aquatic environment - long term hazard	Category 1	H410

Regulation (EC) 67/548/EEC and 1999/45/EC:

Xn; R20; R42/43; R51; R53

2.2 Label Elements

Hazard pictograms and signal word (Regulation (EC) No. 1272/2008):



GHS08



GHS09

Signal word: Danger



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® CoCr F75 Type A

Revision Date: July 27th, 2016

Hazard determining components of labelling: Nickel, Cobalt

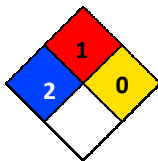
Hazard statements:

H317: May cause an allergic skin reaction
H319: Causes serious eye irritation
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled
H350: May cause cancer
H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child
H372: Causes damage to organs through prolonged or repeated exposure
H400: Very toxic to aquatic life
H410: Very toxic to aquatic life with long lasting effects

Precautionary statements:

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathing dust.
P264: Wash hands thoroughly after handling
P270: Do not eat, drink or smoke when using this product.
P271: Use only in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment.
P280: Wear protective gloves, protective clothing and eye protection.
P284: Wear respiratory protection.
P302+352: IF ON SKIN: Wash with plenty of soap and water.
P304+340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P312: Call a POISON CENTER or doctor/physician if you feel unwell.
P314: Get medical attention if you feel unwell
P333+313: If skin irritation occurs: Get medical advice/attention.
P337+313: If eye irritation persists: Get medical attention
P363: Wash contaminated clothing before reuse
P391: Collect spillage

NFPA rating



NFPA Ratings

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Hazardous Materials Identification System (HMIS):

(Degree of hazard: 0 = low, 4 = extreme):

Health 2
Flammability 2
Physical Hazards 0

Personal Protection:

Skin, eye protection

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical characterization:

Description: Metallic alloy powder



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
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Revision Date: July 27th, 2016

3.2 Dangerous components:

Chemical name	CAS-No	EC-No	%	Classification	
				Regulation 67/548/EEG or 1999/45/EG	Regulation (EC) No. 1272/2008
Cobalt	7440-48-4	231-158-0	59-64	R42/43 R53	Resp. Sens. 1, H334 Skin Sens. 1, H317 Eye Irrit. 2, H319 Carc. 1, H350 Repr. 2, H361 Aqu. Acute 1, H400 Aqu. Chron. 1, H410
Chromium	7440-47-3	231-157-5	27-30	Not Applicable	Not Applicable
Molybdenum	7439-98-7	231-107-2	5-7	Not Applicable	Not Applicable
Manganese	7439-96-5	231-105-1	<1	R11 R15 F	Water react. 1, H260
Iron	7439-89-6	231-096-4	<0.75	R11	Flam. Sol. 1, H228
Silicium	7439-95-4	231-104-6	<1	R11	Flam. Sol. 1, H228

4. FIRST AID MEASURES

4.1 General Information: Ensure that eyewash stations and safety showers are close to the workstation location.

4.2 Description of First Aid Measures

Skin contact: Wash off thoroughly with soap and water. If rash develops, seek medical attention.

Eye contact: Irrigate thoroughly with water, including under the eyelids, for at least 10-20 minutes. Obtain medical attention if irritation persists.

Inhalation: Move affected person to fresh air, rest and keep warm. In severe cases, if exposure has been great, or if respiratory irritation occurs, obtain medical attention.

Ingestion: Wash out mouth thoroughly with water. Obtain medical attention if further symptoms develop.

4.2 Most important symptoms and effects, both acute and delayed

Skin Contact: Rash may develop.

Eye Contact: Mechanical irritation.

Inhalation: Possible asthma like symptoms.

Ingestion: No information

Chronic: Can cause an allergic skin reaction with repeated or prolonged exposure consisting of redness, swelling and/or rash (urticaria).

4.3 Indications of any immediate medical attention and special treatment needed

Skin Contact: Treat symptomatically

Eye Contact: Treat symptomatically

Inhalation: Treat symptomatically

4.4 Self-protection of the first aider: Put on appropriate protective equipment (see section 8). Move exposed person to fresh air.



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5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media: The product itself is not flammable. Adapt extinguishing measures to surroundings. Use extinguishing type D powder or sand if available.

5.2 Extinguishing media which must not be used for safety reasons: High volume water jet.

5.3 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases: increased fire hazard during dust formation.

5.4 Special protective equipment for fire-fighters: breathing protection in the presence of dust.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions: Keep unnecessary personnel away. Wear appropriate protective equipment and clothing.

6.2 Environmental precautions: Take precautions to ensure product does not contaminate ground or enter the sewer or drainage system.

6.3 Methods for cleaning up:

Wear appropriate protective equipment and clothing.

For containment:	not applicable
For cleaning up small spillage:	vacuum with equipment fitted with HEPA or immersion filtration.
For cleaning up large spillage:	solids should be carefully transferred to salvage containers. Any residues should be treated as small spillages.
Other information:	no information.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures:	Work using a suitable extraction/ventilation system.
Measures to prevent fire:	Not applicable.
Measures to protect the environment:	Use appropriate containment to avoid environmental hazard.
Advice on general occupational hygiene:	Avoid contact with skin and eyes. Do not breathe dust. Wash hand and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use.

7.2 Conditions for safe storage

Technical measures and storage conditions:	Store in sealed container in dry conditions and keep the container closed when not in use.
Packaging materials:	Keep in the container supplied, or suitable metal, plastic or polythene container.
Requirements for storage rooms and vessels:	Containers should be stored under cover in a clean and dry environment
Storage class:	Not applicable.
Further information on storage conditions:	Local regulations should be followed regarding the storage of this material.



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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:

Exposure limits	OSHA/PEL	ACGIH/TLV
Cobalt	0.1 mg/m ³	0.02 mg/m ³
Chromium	1 mg/m ³	0.5 mg/m ³
Molybdenum	15 mg/m ³ *	10 mg/m ³ **
Manganese	5 mg/m ³	0.2 mg/m ³
Silicium	15/ 5 mg/m ³ (total/respiratory)	0.3 mg/m ³ (as SiO ₂)
Iron	No exposure limit established	

* insoluble compounds, total dust

** insoluble compounds, inhalable

8.2 Exposure controls

Technical measures to prevent exposure:

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. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

Instructual measures to prevent exposure:

Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Wash hands after handling and before eating, smoking and using the lavatory and at the end of the day.

Personal protection equipment:

Respiratory protection: If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided. Use a dust mask or filter apparatus of minimal level FFP3 or N99.

Hand protection: Use impervious nitrile gloves.

Eye protection: Wear safety glasses or chemical goggles.

Body protection: Use long sleeved antistatic garments and closed, antistatic safety shoes.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state: Powder

Colour: Dark gray

Odour: Odourless



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9.2 Important health, safety and environmental information

pH (20 °C):	NA
Melting point/range (°C):	1315 - 1540
Boiling point/range (°C):	No Data
Flash point (°C):	No Data
Ignition temperature (°C):	No Data
Vapour pressure (°C):	No Data
Density (g/cm ³):	8.4
Bulk density (kg/m ³):	No Data
Water solubility (20°C in g/l):	No Data
Viscosity:	NA
Auto-ignition temperature:	No Data
Decomposition temperature:	No Data
Dust explosion hazard:	No Data
Explosive properties	No Data
Oxidising properties	No Data
Particle size	100% <1mm

10. STABILITY AND REACTIVITY

10.1 Chemical Stability: Stable under normal conditions and under recommended storage conditions

10.2 Reactivity: No data.

10.3 Possibility of hazardous reactions: No Data

10.4 Conditions to avoid: Prevent formation of dust clouds and accumulation of fines.

10.5 Incompatible materials: oxidizing agents. strong acids and strong bases.

10.6 Hazardous decomposition products: No data.

11. TOXICOLOGICAL INFORMATION

11.1 Likely Routes of Exposure:

Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

11.2 Symptoms of Exposure:

Fines/dusts may irritate skin and eyes.

11.2 Acute and chronic effects:

Cobalt: Acute exposure to cobalt metal dusts or fumes is characterized by irritation to the eyes, and to a lesser extent, irritation to the skin. Chronic exposure to cobalt metal dust or fumes may cause respiratory and dermatologic signs and symptoms. Chronic exposure to cobalt by inhalation in humans results in effects on the respiratory system, such as respiratory irritation, wheezing, asthma, decreased lung function, pneumonia, and fibrosis.

Chromium: Although much is known about the health effects of chromium compounds, the health effects of chromium metal, Cr(0), is not well studied. Due to insolubility most elements in their metallic state are not considered to be serious health hazards.

Molybdenum: No data

Manganese: Chronic inhalation exposure of humans to high levels of manganese may result in a syndrome called manganism which typically begins with feelings of weakness and lethargy and progresses to other symptoms such as gait disturbances, clumsiness, tremors, speech disturbances, a mask-like facial expression and psychological disturbances. Manganese is an essential micronutrient in humans.



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Silicium: No scientific data is available on the toxicity of silicium. This product is also not considered to be mutagenic, teratogenic or carcinogenic. Oral LD50 Rat: 3160 mg/kg

Iron: Irritating to the respiratory tract, iron compounds may cause pulmonary fibrosis if dusts are inhaled. Inhalation of large amounts may cause iron pneumoconiosis. Chronic inhalation of finely divided powder may cause chronic iron poisoning and pathological deposition of iron in the body tissue. Ingestion may cause vomiting, diarrhea, pink urine, black stool, and liver damage. Iron compounds may also cause damage to the kidneys.

Acute Toxicity: No data

Carcinogenicity:

Cobalt: NTP: R - reasonably anticipated to be a human carcinogen; **IARC:** 2B - possibly carcinogenic to humans

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

12. Ecological information

12.1. Toxicity

Long-term Ecotoxicity May cause long-term adverse effects in the aquatic environment

12.2. Persistence and degradability

Abiotic Degradation	No data available
Physical-and photo-chemical elimination	No data available
Biodegradation	Not readily biodegradable.

12.3. Bioaccumulative potential

Bioconcentration factor (BCF) No data available

12.4. Mobility in soil

Known or predicted distribution to environmental compartments	No data
Adsorption/Desorption	No data available

12.7 Additional information

Do not allow product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.

13. DISPOSAL CONSIDERATIONS

13.1 Appropriate disposal / Product: Do not contaminate sewers, drains, soil or surface waters with this material. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with all local, state, and federal regulations.

13.2 Packaging disposal: Consult local and national guidelines for the disposal of discarded packaging.

13.3 Additional information: Prior to disposal 3D Systems recommends consulting your local waste disposal authority or an approved waste disposal firm to ensure regulatory compliance.



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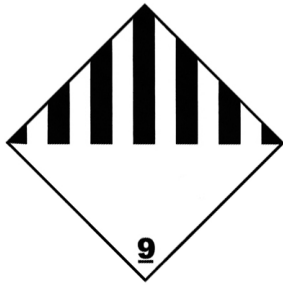
according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
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JIS Z 7253 (2012) Japan

LaserForm® CoCr F75 Type A

Revision Date: July 27th, 2016

14. TRANSPORT INFORMATION

UN Number	UN 3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (cobalt)
Transport hazard class(es)	9
Packing group	III
Label(s)	



Environmental hazards
Special precautions for user

May cause long-term adverse effects in the aquatic environment
Always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

15. REGULATORY INFORMATION

15.1 EU regulations

EINEC/ELINCS/NLP: All materials are listed
REACH Annex XVII: None listed

15.2. US FEDERAL

TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): All components are listed or exempted
SARA 302/304: No products were found.
SARA 311/312: Hazards identification: Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: chromium; Nickel

15.3 Canada

WHMIS: Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
NPRI: The following components are listed: Cobalt (and its compounds); Chromium (and its compounds)

15.4 Australian regulations

SUSDP, Industrial Chemicals Act 1989:
Australian Inventory of Chemical Substances, AICS: Listed



Safety Data Sheet

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JIS Z 7253 (2012) Japan

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Revision Date: July 27th, 2016

15.5 Japanese regulations

Chemical Substance:	Pneumoconiosis Act Dust Disability Prevention Rules
Components:	
Cobalt:	ISHL: Cobalt and its compounds, Deliver of Documents, etc. Articles 57-2.18-2 (MSDS), Table 9-172, $\geq 0.1\%$ Cobalt and its inorganic compounds, Labeling, etc. Articles 57.18. Table 9-04, $\geq 0.1\%$ Cobalt and its inorganic compounds, Specific Chemical Substances Disability Prevention Rules, 13-2 PRTR: Cobalt and its compounds, Designated Class I Substance, I-132 (previously 1-100), $\geq 1\%$ Ship Safety Act: Combustible material, Pyrophoric substance Combustible material, Flammable substance Aviation Law: Transport ban; combustible material, pyrophoric substance (194-1) Clean Air Act: Cobalt and its compound, Hazardous Air Pollutants/ No. 60 of Environmental Council 9th report Labor Standards Act: Cobalt and its compounds, Rule No. 75-2
Chromium:	Water Pollution Control Law: Designated Substance PRTR: Chromium and Chromium(III) compounds, Designated Class I Substance, I-87, $\geq 1\%$ ISHL: Chromium and Chromium(III) compounds, Articles 57-2 and 18-2, Table 9-142, $\geq 0.1\%$ Air Pollution Control Law: Hazardous Air Pollutants/Priority Initiative No. 49 Waste Disposal and Public Cleaning Law: Article 29
Manganese:	PRTR: Manganese and its compounds, Designated Class I Substance, I-412, $\geq 1\%$ ISHL: Manganese and its compounds, Articles 57-2 and 18-2, Table 9-550, $\geq 1\%$ Water Pollution Control Law: Designated Substance Specific Chemical Substances Disability Prevention Rules: Designated Substance, 2-33 Clean Air Act: Hazardous Air Pollutants, No. 225
Molybdenum:	Water Pollution Control Law: Designated Substance Clean Air Act: Hazardous Air Pollutants, No. 243

OTHER INFORMATION

16.1 Relevant Hazard Statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

Skin sens. 1, H317- Skin sensitization, category 1, H317: May cause an allergic skin reaction
Eye irrit. 2, H319- Eye irritant, category 2, H319: Causes serious eye irritation
Resp. sens. 1 H334- Respiratory sensitization, H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled
Carc.1, H350- Carcinogenicity, category 1, H350: May cause cancer
Repr. 2, H361fd- Reproductive toxicant, category 2, H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child.
STOT RE 1, H372- Specific target organ toxicity-repeated exposure, category 1, H372: Causes damage to organs through prolonged or repeated exposure
Aqu. Acute 1, H400- Aquatic environment – acute hazard, Category 1, H400: Very toxic to aquatic life.
Aqu.Chron. 1, H410- Aquatic environment - long-term hazard, category 1, H410: Very toxic to aquatic life with long lasting effects
Flam. Sol.1, H228- Flammable solids, category 1, H228: Flammable solid
Water react. 1, H260- Water reactivity, category 1, H260: In contact with water releases flammable gases which may ignite spontaneously



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LaserForm® CoCr F75 Type A

Revision Date: July 27th, 2016

Relevant Precautionary statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

- P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathing dust.
P264: Wash hands thoroughly after handling
P270: Do not eat, drink or smoke when using this product.
P271: Use only in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment.
P280: Wear protective gloves, protective clothing and eye protection.
P284: Wear respiratory protection.
P302+352: IF ON SKIN: Wash with plenty of soap and water.
P304+340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P312: Call a POISON CENTER or doctor/physician if you feel unwell.
P314: Get medical attention if you feel unwell
P333+313: If skin irritation occurs: Get medical advice/attention.
P337+313: If eye irritation persists: Get medical attention
P363: Wash contaminated clothing before reuse
P391: Collect spillage

Relevant R-Phrases (number and full text) referred to in sections 2 and 3:

- Xn: Harmful
R42/43: May cause sensitization by inhalation and skin contact
R53: May cause long-term adverse effects in the aquatic environment
R11: Highly flammable
R15: Contact with water liberates extremely flammable gases
F: Flammable

16.2 Further information:

SDS Creation Date: July 27th 2016

SDS Revision #: 00-A

SDS Revision Date: -

Reason for Revision: -

www.3dsystems.com

800.793.3669 (Toll-free in the US GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

803.326.3900 (Outside the U.S. GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

+44 144-2282600 (Europe GMT+01:00; Mon – Fri, 08:00 a.m. - 17:00 p.m. MEZ)

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Safety Data Sheet

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Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® Ni625 Type A

Revision Date: July 27th, 2016

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

1.1 Identification of the mixture: Nickel Alloy

1.2 Type: Nickel based superalloy

Contains the following substances with hazardous properties: Nickel

1.3 Use of the preparation: For use with ProX® DMP 320 printers

1.4 Uses advised against:

Use of nickel in articles intended for direct and prolonged contact with the skin where the release of nickel exceeds the limit set out in Directives 94/27/EC and 2004/6/EC and REACH regulation 1907/2009 (Annex XVII).

Use of nickel in nickel-containing food contact materials for which migration into foodstuff would exceed more than 0.1 mg/kg of nickel in accordance with the Council of Europe Guidelines on metals and alloys used as food contact materials

Use of nickel in immersion-type kettles which would release more than 0.05 mg/l of nickel into the water in accordance with the Council of Europe Guidelines on metals and alloys used as food contact materials.

Use of nickel in commercially available "do-it-yourself" home electroplating kits.

1.5 Company/undertaking identification:

3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina U.S.A.
Phone: 803.326.3900 or
Toll-free Phone: 800.793.3669
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
800.424.9300 – Chemtrec

3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
Herts HP2 7 United Kingdom
Phone: +44 144-2282600
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
703.527.3887 - Chemtrec

3D Systems / Australia
5 Lynch Street
Hawthorn, VIC 3122
+1 03 9819-4422
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
+(61) 29037.2994 – Aus Chemtrec

2. HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification

Regulation (EC) No. 1272/2008, HazCom 29 CFD 1910:

Skin sensitization	Category 1	H317
Acute toxicity	Category 4	H332
Respiratory sensitization	Category 1	H334
Carcinogenicity	Category 1	H350
Specific target organ toxicity-repeated exposure	Category 1	H372
Aquatic environment - long term hazard	Category 3	H412

Regulation (EC) 67/548/EEC and 1999/45/EC:

T; R48/23 Xn; R40 Xi; R43 R52/53

2.2 Label Elements

Hazard pictograms and signal word (Regulation (EC) No. 1272/2008):



GHS07



GHS08

Signal word: Danger



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® Ni625 Type A

Revision Date: July 27th, 2016

Hazard determining components of labelling: Nickel, Cobalt

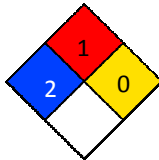
Hazard statements:

H317: May cause an allergic skin reaction
H332: Harmful if inhaled
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled
H350: May cause cancer
H372: Causes damage to organs through prolonged or repeated exposure
H412: Harmful to aquatic life with long lasting effects

Precautionary statements:

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P261: Avoid breathing dust.
P270: Do not eat, drink or smoke when using this product.
P271: Use only in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment.
P280: Wear protective gloves, protective clothing and eye protection.
P284: Wear respiratory protection.
P302+352: IF ON SKIN: Wash with plenty of soap and water.
P304+340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312: Call a POISON CENTER or doctor/physician if you feel unwell.
P333 + P313: If skin irritation occurs: Get medical advice/attention.
P363: Wash contaminated clothing before reuse.

NFPA rating



NFPA Ratings

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Hazardous Materials Identification System (HMIS):

(Degree of hazard: 0 = low, 4 = extreme):

Health **2**
Flammability **2**
Physical Hazards **0**

Personal Protection:

Skin, eye protection

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical characterization:

Description: Metallic alloy powder



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
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LaserForm® Ni625 Type A

Revision Date: July 27th, 2016

3.2 Dangerous components:

Chemical name	CAS-No	EC-No	%	Classification	
				Regulation 67/548/EEG or 1999/45/EG	Regulation (EC) No. 1272/2008
Nickel	7440-02-0	231-111-4	≥55	R40 R43 R48/23 R52/53 T	Acute Tox. 4, H332 Carc.2, H351 Skin Sens. 1, H 317 STOT RE 1, H372 Aqu.Chron. 3, H412
Chromium	7440-47-3	231-157-5	20-23	Not Applicable	Not Applicable
Molybdenum	7439-98-7	231-107-2	8-10	Not Applicable	Not Applicable
Iron	7439-89-6	231-096-4	≤5	R11	Flam. Sol. 1, H228
Niobium	7440-03-1	231-113-5	3-4.5	R17 F	Pyr. Sol. 1, H250
Cobalt	7440-48-4	231-158-0	≤1	R42/43 R53	Resp. Sens 1, H334 Skin Sens. 1, H317 Eye Irrit. 2, H319 Carc. 1, H350 Repr. 2, H361 Aqu. Acute 1, H400 Aqu. Chron. 1, H410
Manganese	7439-96-5	231-105-1	≤0.5	R11 R15 F	Water react. 1, H260

4. FIRST AID MEASURES

4.1 General Information: Ensure that eyewash stations and safety showers are close to the workstation location.

4.2 Description of First Aid Measures

Skin contact: Wash off thoroughly with soap and water. If rash develops, seek medical attention.

Eye contact: Irrigate thoroughly with water, including under the eyelids, for at least 10-20 minutes. Obtain medical attention if irritation persists.

Inhalation: Move affected person to fresh air, rest and keep warm. In severe cases, if exposure has been great, or if respiratory irritation occurs, obtain medical attention.

Ingestion: Wash out mouth thoroughly with water. Obtain medical attention if further symptoms develop.

4.2 Most important symptoms and effects, both acute and delayed

Skin Contact: Rash may develop.

Eye Contact: Mechanical irritation.

Inhalation: Possible asthma like symptoms.

Ingestion: No information

4.3 Indications of any immediate medical attention and special treatment needed

Skin Contact: Treat symptomatically

Eye Contact: Treat symptomatically

Inhalation: Treat symptomatically

4.4 Self-protection of the first aider: Put on appropriate protective equipment (see section 8). Move exposed person to fresh air.



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5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media: The product itself is not flammable. Adapt extinguishing measures to surroundings. Use extinguishing type D powder or sand if available.

5.2 Extinguishing media which must not be used for safety reasons: High volume water jet.

5.3 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases: increased fire hazard during dust formation.

5.4 Special protective equipment for fire-fighters: breathing protection in the presence of dust.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions: Keep unnecessary personnel away. Wear appropriate protective equipment and clothing.

6.2 Environmental precautions: Take precautions to ensure product does not contaminate ground or enter the sewer or drainage system.

6.3 Methods for cleaning up:

Wear appropriate protective equipment and clothing.

For containment:	not applicable
For cleaning up small spillage:	vacuum with equipment fitted with HEPA or immersion filtration.
For cleaning up large spillage:	solids should be carefully transferred to salvage containers. Any residues should be treated as small spillages.
Other information:	no information.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures:	Work using a suitable extraction/ventilation system.
Measures to prevent fire:	Not applicable.
Measures to protect the environment:	Use appropriate containment to avoid environmental hazard.
Advice on general occupational hygiene:	Avoid contact with skin and eyes. Do not breathe dust. Wash hand and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use.

7.2 Conditions for safe storage

Technical measures and storage conditions:	Store in sealed container in dry conditions and keep the container closed when not in use.
Packaging materials:	Keep in the container supplied, or suitable metal, plastic or polythene container.
Requirements for storage rooms and vessels:	Containers should be stored under cover in a clean and dry environment
Storage class:	Not applicable.
Further information on storage conditions:	Local regulations should be followed regarding the storage of this material.



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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:

Exposure limits	OSHA/PEL	ACGIH/TLV
Nickel	1mg/m ³	1.5mg/m ³
Chromium	1 mg/m ³	0.5 mg/m ³
Iron	No exposure limit established	
Molybdenum	15 mg/m ³ *	10 mg/m ³ **
Niobium	No exposure limit established	
Cobalt	0.1 mg/m ³	0.02 mg/m ³
Manganese	5 mg/m ³	0.2 mg/m ³

* insoluble compounds, total dust

* insoluble compounds, inhalable

8.2 Exposure controls

Technical measures to prevent exposure:

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. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

Instructional measures to prevent exposure:

Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Wash hands after handling and before eating, smoking and using the lavatory and at the end of the day.

Personal protection equipment:

Respiratory protection: If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided. Use a dust mask or filter apparatus of minimal level FFP3 or N99.

Hand protection: Use impervious nitrile gloves.

Eye protection: Wear safety glasses or chemical goggles.

Body protection: Use long sleeved antistatic garments and closed, antistatic safety shoes.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state: Powder

Colour: Gray

Odour: Odourless



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9.2 Important health, safety and environmental information

pH (20 °C):	NA
Melting point/range (°C):	1290 - 1350
Boiling point/range (°C):	No Data
Flash point (°C):	No Data
Ignition temperature (°C):	No Data
Vapour pressure (°C):	No Data
Density (g/cm3):	8.44
Bulk density (kg/m3):	No Data
Water solubility (20°C in g/l):	No Data
Viscosity:	NA
Auto-ignition temperature:	No Data
Decomposition temperature:	No Data
Dust explosion hazard:	No Data
Explosive properties	No Data
Oxidising properties	No Data
Particle size	100% <1mm

10. STABILITY AND REACTIVITY

10.1 Chemical Stability: Stable under normal conditions and under recommended storage conditions

10.2 Reactivity: No data.

10.3 Possibility of hazardous reactions: No Data

10.4 Conditions to avoid: Prevent formation of dust clouds and accumulation of fines.

10.5 Incompatible materials: oxidizing agents. strong acids and strong bases.

10.6 Hazardous decomposition products: No data.

11. TOXICOLOGICAL INFORMATION

11.1 Likely Routes of Exposure:

Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

11.2 Symptoms of Exposure:

Fines/dusts may irritate skin and eyes.

11.2 Acute and chronic effects:

Nickel: The most common harmful health effect of metallic nickel in humans is an allergic skin reaction in those who are sensitive to nickel. Although nickel compounds are known human carcinogens, the evidence suggests that the relatively insoluble metallic nickel is less likely to present a carcinogenic hazard than are the nickel compounds that tend to release proportionately more nickel ion.

Chromium: Although much is known about the health effects of chromium compounds, the health effects of chromium metal, Cr(0), is not well studied. Due to insolubility most elements in their metallic state are not considered to be serious health hazards.

Iron: Irritating to the respiratory tract, iron compounds may cause pulmonary fibrosis if dusts are inhaled. Inhalation of large amounts may cause iron pneumoconiosis. Chronic inhalation of finely divided powder may cause chronic iron poisoning and pathological deposition of iron in the body tissue. Ingestion may cause vomiting, diarrhea, pink urine, black stool, and liver damage. Iron compounds may also cause damage to the kidneys.



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Molybdenum: No data

Tungsten: No data

Niobium: No data

Cobalt: Acute exposure to cobalt metal dusts or fumes is characterized by irritation to the eyes, and to a lesser extent, irritation to the skin. Chronic exposure to cobalt metal dust or fumes may cause respiratory and dermatologic signs and symptoms. Chronic exposure to cobalt by inhalation in humans results in effects on the respiratory system, such as respiratory irritation, wheezing, asthma, decreased lung function, pneumonia, and fibrosis.

Manganese: Chronic inhalation exposure of humans to high levels of manganese may result in a syndrome called manganism which typically begins with feelings of weakness and lethargy and progresses to other symptoms such as gait disturbances, clumsiness, tremors, speech disturbances, a mask-like facial expression and psychological disturbances. Manganese is an essential micronutrient in humans.

Acute Toxicity: No data

Carcinogenicity:

Nickel: NTP: R - reasonably anticipated to be a human carcinogen; **IARC:** 2B - possibly carcinogenic to humans

Cobalt: NTP: R - reasonably anticipated to be a human carcinogen; **IARC:** 2B - possibly carcinogenic to humans

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

12. Ecological information

12.1. Toxicity

Long-term Ecotoxicity May cause long-term adverse effects in the aquatic environment

12.2. Persistence and degradability

Abiotic Degradation	No data available
Physical-and photo-chemical elimination	No data available
Biodegradation	Not readily biodegradable.

12.3. Bioaccumulative potential

Bioconcentration factor (BCF) No data available

12.4. Mobility in soil

Known or predicted distribution to environmental compartments	No data
Adsorption/Desorption	No data available

12.7 Additional information

Do not allow product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.



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13. DISPOSAL CONSIDERATIONS

13.1 Appropriate disposal / Product: Do not contaminate sewers, drains, soil or surface waters with this material. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with all local, state, and federal regulations.

13.2 Packaging disposal: Consult local and national guidelines for the disposal of discarded packaging.

13.3 Additional information: Prior to disposal 3D Systems recommends consulting your local waste disposal authority or an approved waste disposal firm to ensure regulatory compliance.

14. TRANSPORT INFORMATION

UN Number	None
UN proper shipping name	Not classified hazardous for transport
Transport hazard class(es)	Not applicable
Packing group	Not applicable
Label(s)	Not applicable
Environmental hazards	None
Special precautions for user	Always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

15. REGULATORY INFORMATION

15.1 EU regulations

EINEC/ELINCS/NLP: All materials are listed
REACH Annex XVII: None listed

15.2. US FEDERAL

TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): All components are listed or exempted
SARA 302/304: No products were found.
SARA 311/312: Hazards identification: Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: chromium; Nickel

15.3 Canada

WHMIS: Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
NPRI: The following components are listed: Cobalt (and its compounds); Chromium (and its compounds)

15.4 Australian regulations

SUSDP, Industrial Chemicals Act 1989:
Australian Inventory of Chemical Substances, AICS: Listed



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15.5 Japanese regulations

Chemical Substance:	Pneumoconiosis Act Dust Disability Prevention Rules
Components:	
Cobalt:	ISHL: Cobalt and its compounds, Deliver of Documents, etc. Articles 57-2.18-2 (MSDS), Table 9-172, ≥0.1% Cobalt and its inorganic compounds, Labeling, etc. Articles 57.18.Table 9-04, ≥0.1% Cobalt and its inorganic compounds, Specific Chemical Substances Disability Prevention Rules, 13-2 PRTR: Cobalt and its compounds, Designated Class I Substance, I-132 (previously 1-100), ≥1% Ship Safety Act: Combustible material, Pyrophoric substance Combustible material, Flammable substance Aviation Law: Transport ban; combustible material, pyrophoric substance (194-1) Clean Air Act: Cobalt and its compound, Hazardous Air Pollutants/ No. 60 of Environmental Council 9th report Labor Standards Act: Cobalt and its compounds, Rule No. 75-2
Chromium:	Water Pollution Control Law: Designated Substance PRTR: Chromium and Chromium(III) compounds, Designated Class I Substance, I-87, ≥1% ISHL: Chromium and Chromium(III) compounds, Articles 57-2 and 18-2, Table 9-142, ≥0.1% Air Pollution Control Law: Hazardous Air Pollutants/Priority Initiative No. 49 Waste Disposal and Public Cleaning Law: Article 29
Nickel:	Water Pollution Control Law: Designated Substance PRTR: Nickel, Designated Class I Substance, I-308 ISHL: Nickel and its compounds, Articles 57-2 and 18-2, Table 9-418, ≥0.1% Specific Chemical Substances Disability Prevention Rules: Nickel compounds, 2-23 Clean Air Act: Hazardous Air Pollutants, No. 148 Labor Standards Act: carcinogenic substance (cancer of the upper respiratory tract or lung from working in the smelting or refining of nickel)
Manganese:	PRTR: Manganese and its compounds, Designated Class I Substance, I-412, ≥1% ISHL: Manganese and its compounds, Articles 57-2 and 18-2, Table 9-550, ≥1% Water Pollution Control Law: Designated Substance Specific Chemical Substances Disability Prevention Rules: Designated Substance, 2-33 Clean Air Act: Hazardous Air Pollutants, No. 225
Molybdenum:	Water Pollution Control Law: Designated Substance Clean Air Act: Hazardous Air Pollutants, No. 243

OTHER INFORMATION

16.1 Relevant Hazard and Precautionary Statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

Skin sens. 1, H317- Skin sensitization, category 1, H317: May cause an allergic skin reaction
Carc.1, H350- Carcinogenicity, category 1, H350: May cause cancer
Carc.2, H351- Carcinogenicity, category 2, H350: Suspected of causing cancer
STOT RE 1, H372- Specific target organ toxicity-repeated exposure, category 1, H372: Causes damage to organs through prolonged or repeated exposure
Aqu.Chron. 3, H412- Aquatic environment - long-term hazard, category 3, H412: Harmful to aquatic life with long lasting effects
Acute Tox. 4, H332- Acute Toxicity, category 4, H332: Harmful if inhaled.
Flam. Sol. 1, H228- Flammable solids, category, H228: Flammable solid
Pyr. Sol. 1, H250- Pyrophoric solids (liquids), category 1, H250: Catches fire spontaneously if exposed to air



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Resp. Sens 1, H334- Sensitisation, respiratory, category 1, H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled
Repr. 2, H361 – Reproduction, category 2, H361: Suspected of damaging fertility or the unborn child.
Water react. 1, H260- Emission of flammable gases in contact with water, category 1, H260: In contact with water releases flammable gases which may ignite spontaneously
Eye Irrit. 2, H319- Eye irritation, category 2, H319: Causes serious eye irritation.
Aqu. Acute 1, H400 – Aquatic environment – acute hazard, category 1, H400: Very toxic to aquatic life
Aqu. Chron. 1, H410- Aquatic environment - long-term hazard, category 1, H410: Very toxic to aquatic life with long-lasting effects

Relevant Precautionary statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P261: Avoid breathing dust.
P270: Do not eat, drink or smoke when using this product.
P271: Use only in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment.
P280: Wear protective gloves, protective clothing and eye protection.
P284: Wear respiratory protection.
P302+352: IF ON SKIN: Wash with plenty of soap and water.
P304+340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312: Call a POISON CENTER or doctor/physician if you feel unwell.
P333 + P313: If skin irritation occurs: Get medical advice/attention.
P363: Wash contaminated clothing before reuse.

Relevant R-Phrases (number and full text) referred to in sections 2 and 3 (according to (EC) 67/548/EEC and 1999/45/EC):

T: Toxic
Xn: Harmfull
Xi : Irritant
R40 : Limited evidence of a carcinogenic effect
R48/23: Danger of serious damage to health by prolonged exposure, Toxic by inhalation
R43 : May cause sensitisation by skin contact
R52/53 : Harmful to aquatic organisms, May cause long-term adverse effects in the aquatic environment
R11: Highly flammable
R17: Spontaneously flammable in air
R42/43: May cause sensitization by inhalation and skin contact
R15: Contact with water liberates extremely flammable gases

Relevant S-Phrases (number and full text) referred to in sections 2 and 3 (according to (EC) 67/548/EEC and 1999/45/EC):

S2 - Keep out of the reach of children
S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection
S45 - In case of accident or if you feel unwell seek medical advice immediately (show the label where possible)

16.2 Further information:

SDS Creation Date: July 27th, 2016
SDS Revision #: 00-A
SDS Revision Date: /
Reason for Revision: /

www.3dsystems.com

800.793.3669 (Toll-free in the US GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

803.326.3900 (Outside the U.S. GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

+44 144-2282600 (Europe GMT+01:00; Mon – Fri, 08:00 a.m. - 17:00 p.m. MEZ)



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

1.1 Identification of the mixture: Nickel Alloy

1.2 Type: Nickel based superalloy
Contains the following substances with hazardous properties: Nickel

1.3 Use of the preparation: For use with ProX® DMP 320 printers

1.4 Uses advised against:

Use of nickel in articles intended for direct and prolonged contact with the skin where the release of nickel exceeds the limit set out in Directives 94/27/EC and 2004/6/EC and REACH regulation 1907/2009 (Annex XVII).

Use of nickel in nickel-containing food contact materials for which migration into foodstuff would exceed more than 0.1 mg/kg of nickel in accordance with the Council of Europe Guidelines on metals and alloys used as food contact materials

Use of nickel in immersion-type kettles which would release more than 0.05 mg/l of nickel into the water in accordance with the Council of Europe Guidelines on metals and alloys used as food contact materials.

Use of nickel in commercially available "do-it-yourself" home electroplating kits.

1.5 Company/undertaking identification:

3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina U.S.A.
Phone: 803.326.3900 or
Toll-free Phone: 800.793.3669
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
800.424.9300 – Chemtrec

3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
Herts HP2 7
United Kingdom
Phone: +44 144-2282600
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
703.527.3887 - Chemtrec

3D Systems / Australia
5 Lynch Street
Hawthorn, VIC 3122
+1 03 9819-4422
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
+(61) 29037.2994 – Aus Chemtrec

2. HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification

Regulation (EC) No. 1272/2008, HazCom 29 CFD 1910:

Carcinogenicity	Category 2	H351
Skin Sensitization	Category 1	H317
Aquatic environment - long term hazard	Category 3	H412
Specific target organ toxicity-repeated exposure	Category 1	H372

Regulation (EC) 67/548/EEC and 1999/45/EC:

T; R48/23 Xn; R40 Xi; R43 R52/53

2.2 Label Elements

Hazard pictograms and signal word (Regulation (EC) No. 1272/2008):



GHS07



GHS08

Signal word: Danger



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Hazard determining components of labelling:

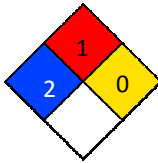
Hazard statements:

H317: May cause an allergic skin reaction
H351: Suspected of causing cancer
H372: Causes damage to organs through prolonged or repeated exposure
H412: Harmful to aquatic life with long lasting effects

Precautionary statements:

P201: Obtain special instructions before use
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe dust.
P270: Do not eat, drink or smoke when using this product.
P271: Use only in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P284: Wear respiratory protection.
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P314: Get medical advice/attention if you feel unwell.
P333 + P313: If skin irritation occurs: Get medical advice/attention.
P362 + P364: Take off contaminated clothing and wash before reuse.

NFPA rating



NFPA Ratings
0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Hazardous Materials Identification System (HMIS):

(Degree of hazard: 0 = low, 4 = extreme);

Health **2**
Flammability **2**
Physical Hazards **0**

Personal Protection:

Skin, eye protection

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical characterization:

Description: Metallic alloy powder



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3.2 Dangerous components:

Chemical name	CAS-No	EC-No	%	Classification	
				Regulation 67/548/EEG or 1999/45/EG	Regulation (EC) No. 1272/2008
Nickel	7440-02-0	231-111-4	50-55	R40 R43 R48/23 R52/53 T	Carc.2, H351 Skin Sens. 1, H 317 STOT RE 1, H372 Aqu.Chron. 3, H412
Chromium	7440-47-3	231-157-5	17-21	Not Applicable	Not Applicable
Iron	7439-89-6	231-096-4	13-24	R11	Flam. Sol. 1, H228
Molybdenum	7439-98-7	231-107-2	2.5-3.5	Not Applicable	Not Applicable
Niobium	7440-03-1	231-113-5	4.5-5.5	R17 F	Pyr. Sol. 1, H250
Cobalt	7440-48-4	231-158-0	≤1	R42/43 R53	Resp. Sens 1, H334 Skin Sens. 1, H 317 Aqu. Chron. 4, H413
Manganese	7439-96-5	231-105-1	≤0.35	R11 R15 F	Water react. 1, H260

4. FIRST AID MEASURES

4.1 General Information: Ensure that eyewash stations and safety showers are close to the workstation location.

4.2 Description of First Aid Measures

Skin contact: Wash off thoroughly with soap and water. If rash develops, seek medical attention.

Eye contact: Irrigate thoroughly with water, including under the eyelids, for at least 10-20 minutes. Obtain medical attention if irritation persists.

Inhalation: Move affected person to fresh air, rest and keep warm. In severe cases, if exposure has been great, or if respiratory irritation occurs, obtain medical attention.

Ingestion: Wash out mouth thoroughly with water. Obtain medical attention if further symptoms develop.

4.2 Most important symptoms and effects, both acute and delayed

Skin Contact: Rash may develop.

Eye Contact: Mechanical irritation.

Inhalation: Possible asthma like symptoms.

Ingestion: No information

4.3 Indications of any immediate medical attention and special treatment needed

Skin Contact: Treat symptomatically

Eye Contact: Treat symptomatically

Inhalation: Treat symptomatically

4.6 Self-protection of the first aider: Put on appropriate protective equipment (see section 8). Move exposed person to fresh air.

5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media: The product itself is not flammable. Adapt extinguishing measures to surroundings. Use extinguishing type D powder or sand if available.



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5.2 Extinguishing media which must not be used for safety reasons: High volume water jet.

5.3 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases: increased fire hazard during dust formation.

5.4 Special protective equipment for fire-fighters: breathing protection in the presence of dust.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions: Keep unnecessary personnel away. Wear appropriate protective equipment and clothing.

6.2 Environmental precautions: Take precautions to ensure product does not contaminate ground or enter the sewer or drainage system.

6.3 Methods for cleaning up:

Wear appropriate protective equipment and clothing.

For containment:	not applicable
For cleaning up small spillage:	vacuum with equipment fitted with HEPA or immersion filtration.
For cleaning up large spillage:	solids should be carefully transferred to salvage containers. Any residues should be treated as small spillages.
Other information:	no information.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures:	Work using a suitable extraction/ventilation system.
Measures to prevent fire:	Not applicable.
Measures to protect the environment:	Use appropriate containment to avoid environmental hazard.
Advice on general occupational hygiene:	Avoid contact with skin and eyes. Do not breathe dust. Wash hand and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use.

7.2 Conditions for safe storage

Technical measures and storage conditions:	Store in sealed container in dry conditions and keep the container closed when not in use.
Packaging materials:	Keep in the container supplied, or suitable metal, plastic or polythene container.
Requirements for storage rooms and vessels:	Containers should be stored under cover in a clean and dry environment
Storage class:	Not applicable.
Further information on storage conditions:	Local regulations should be followed regarding the storage of this material.



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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:

Exposure limits	OSHA/PEL	ACGIH/TLV
Nickel	1 mg/m ³	1.5 mg/m ³
Chromium	1 mg/m ³	0.5 mg/m ³
Iron	No exposure limit established	
Molybdenum	15 mg/m ³ *	10 mg/m ³ **
Niobium	No exposure limit established	
Cobalt	0.1 mg/m ³	0.02 mg/m ³
Manganese	5 mg/m ³	0.2 mg/m ³

* insoluble compounds, total dust

** insoluble compounds, inhalable

8.2 Exposure controls

Technical measures to prevent exposure:

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. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

Instructual measures to prevent exposure:

Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Wash hands after handling and before eating, smoking and using the lavatory and at the end of the day.

Personal protection equipment:

Respiratory protection: If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided. Use a dust mask or filter apparatus of minimal level FFP3.

Hand protection: Use impervious nitrile gloves.

Eye protection: Wear safety glasses or chemical goggles.

Body protection: Use long sleeved antistatic garments and closed, antistatic safety shoes.





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9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state: Powder

Colour: Gray

Odour: Odourless

9.2 Important health, safety and environmental information

pH (20 °C):	NA
Melting point/range (°C):	1354 - 1413
Boiling point/range (°C):	No Data
Flash point (°C):	No Data
Ignition temperature (°C):	No Data
Vapour pressure (°C):	No Data
Density (g/cm³):	8.19
Bulk density (kg/m³):	No Data
Water solubility (20°C in g/l):	No Data
Viscosity:	NA
Auto-ignition temperature:	No Data
Decomposition temperature:	No Data
Dust explosion hazard:	No Data
Explosive properties	No Data
Oxidising properties	No Data
Particle size	100% <1mm

10. STABILITY AND REACTIVITY

10.1 Chemical Stability: Stable under normal conditions and under recommended storage conditions

10.2 Reactivity: No data.

10.3 Possibility of hazardous reactions: No Data

10.4 Conditions to avoid: Prevent formation of dust clouds and accumulation of fines.

10.5 Incompatible materials: oxidizing agents. strong acids and strong bases.

10.6 Hazardous decomposition products: No data.

11. TOXICOLOGICAL INFORMATION

11.1 Likely Routes of Exposure:

Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

11.2 Symptoms of Exposure:

Fines/dusts may irritate skin and eyes.



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11.2 Acute and chronic effects:

Nickel: The most common harmful health effect of metallic nickel in humans is an allergic skin reaction in those who are sensitive to nickel. Although nickel compounds are known human carcinogens, the evidence suggests that the relatively insoluble metallic nickel is less likely to present a carcinogenic hazard than are the nickel compounds that tend to release proportionately more nickel ion.

Chromium: Although much is known about the health effects of chromium compounds, the health effects of chromium metal, Cr(0), is not well studied. Due to insolubility most elements in their metallic state are not considered to be serious health hazards.

Iron: Irritating to the respiratory tract, iron compounds may cause pulmonary fibrosis if dusts are inhaled. Inhalation of large amounts may cause iron pneumoconiosis. Chronic inhalation of finely divided powder may cause chronic iron poisoning and pathological deposition of iron in the body tissue. Ingestion may cause vomiting, diarrhea, pink urine, black stool, and liver damage. Iron compounds may also cause damage to the kidneys.

Molybdenum: No data

Tungsten: No data

Niobium: No data

Cobalt: Acute exposure to cobalt metal dusts or fumes is characterized by irritation to the eyes, and to a lesser extent, irritation to the skin. Chronic exposure to cobalt metal dust or fumes may cause respiratory and dermatologic signs and symptoms. Chronic exposure to cobalt by inhalation in humans results in effects on the respiratory system, such as respiratory irritation, wheezing, asthma, decreased lung function, pneumonia, and fibrosis.

Manganese: Chronic inhalation exposure of humans to high levels of manganese may result in a syndrome called manganism which typically begins with feelings of weakness and lethargy and progresses to other symptoms such as gait disturbances, clumsiness, tremors, speech disturbances, a mask-like facial expression and psychological disturbances. Manganese is an essential micronutrient in humans.

Acute Toxicity: No data

Carcinogenicity:

Nickel: NTP: R - reasonably anticipated to be a human carcinogen; IARC: 2B - possibly carcinogenic to humans

Cobalt: NTP: R - reasonably anticipated to be a human carcinogen; IARC: 2B - possibly carcinogenic to humans

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.



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12. Ecological information

12.1. Toxicity

Long-term Ecotoxicity May cause long-term adverse effects in the aquatic environment

12.2. Persistence and degradability

Abiotic Degradation No data available

Physical-and photo-chemical elimination No data available

Biodegradation Not readily biodegradable.

12.3. Bioaccumulative potential

Bioconcentration factor (BCF) No data available

12.4. Mobility in soil

Known or predicted distribution to environmental compartments No data

Adsorption/Desorption No data available

12.7 Additional information

Do not allow product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.

13. DISPOSAL CONSIDERATIONS

13.1 Appropriate disposal / Product: Do not contaminate sewers, drains, soil or surface waters with this material. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with all local, state, and federal regulations.

13.2 Packaging disposal: Consult local and national guidelines for the disposal of discarded packaging.

13.3 Additional information: Prior to disposal 3D Systems recommends consulting your local waste disposal authority or an approved waste disposal firm to ensure regulatory compliance.

14. TRANSPORT INFORMATION

UN Number None

UN proper shipping name Not classified hazardous for transport

Transport hazard class(es) Not applicable

Packing group Not applicable

Label(s) Not applicable

Environmental hazards None

Special precautions for user Always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.



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15. REGULATORY INFORMATION

15.1 EU regulations

EINEC/ELINCS/NLP: All materials are listed
REACH Annex XVII: None listed

15.2. US FEDERAL

TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): All components are listed or exempted
SARA 302/304: No products were found.
SARA 311/312: Hazards identification: Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: chromium; Nickel

15.3 Canada

WHMIS: Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
NPRI: The following components are listed: Cobalt (and its compounds); Chromium (and its compounds)

15.4 Australian regulations

SUSDP, Industrial Chemicals Act 1989:
Australian Inventory of Chemical Substances, AICS: Listed

15.5 Japanese regulations

Chemical Substance: Pneumoconiosis Act
Dust Disability Prevention Rules

Components:

Cobalt: ISHL: Cobalt and its compounds, Deliver of Documents, etc. Articles 57-2.18-2 (MSDS), Table 9-172, $\geq 0.1\%$
Cobalt and its inorganic compounds, Labeling, etc. Articles 57.18. Table 9-04, $\geq 0.1\%$
Cobalt and its inorganic compounds, Specific Chemical Substances Disability Prevention Rules, 13-2
PRTR: Cobalt and its compounds, Designated Class I Substance, I-132 (previously 1-100), $\geq 1\%$
Ship Safety Act: Combustible material, Pyrophoric substance
Combustible material, Flammable substance
Aviation Law: Transport ban; combustible material, pyrophoric substance (194-1)
Clean Air Act: Cobalt and its compound, Hazardous Air Pollutants/ No. 60 of Environmental Council 9th report
Labor Standards Act: Cobalt and its compounds, Rule No. 75-2

Chromium: Water Pollution Control Law: Designated Substance
PRTR: Chromium and Chromium(III) compounds, Designated Class I Substance, I-87, $\geq 1\%$
ISHL: Chromium and Chromium(III) compounds, Articles 57-2 and 18-2, Table 9-142, $\geq 0.1\%$
Air Pollution Control Law: Hazardous Air Pollutants/Priority Initiative No. 49
Waste Disposal and Public Cleaning Law: Article 29

Nickel: Water Pollution Control Law: Designated Substance
PRTR: Nickel, Designated Class I Substance, I-308
ISHL: Nickel and its compounds, Articles 57-2 and 18-2, Table 9-418, $\geq 0.1\%$
Specific Chemical Substances Disability Prevention Rules: Nickel compounds, 2-23
Clean Air Act: Hazardous Air Pollutants, No. 148
Labor Standards Act: carcinogenic substance (cancer of the upper respiratory tract or lung from working in the smelting or refining of nickel)



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Manganese:	PRTR: Manganese and its compounds, Designated Class I Substance, I-412, ≥1% ISHL: Manganese and its compounds, Articles 57-2 and 18-2, Table 9-550, ≥1% Water Pollution Control Law: Designated Substance Specific Chemical Substances Disability Prevention Rules: Designated Substance, 2-33 Clean Air Act: Hazardous Air Pollutants, No. 225
Molybdenum:	Water Pollution Control Law: Designated Substance Clean Air Act: Hazardous Air Pollutants, No. 243

OTHER INFORMATION

16.1 Relevant Hazard and Precautionary Statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

Skin sens. 1, H 317- Skin sensitization, category 1, H317: May cause an allergic skin reaction
Carc.2, H351- Carcinogenicity, category 2, H351: Suspected of causing cancer
STOT RE 1, H372- Specific target organ toxicity-repeated exposure, category 1, H372: Causes damage to organs through prolonged or repeated exposure
Aqu.Chron. 3, H412- Aquatic environment - long-term hazard, category 3, H412: Harmful to aquatic life with long lasting effects
Flam. Sol. 1, H228- Flammable solids, category, H228: Flammable solid
Pyr. Sol. 1, H250- Pyrophoric solids (liquids), category 1, H250: Catches fire spontaneously if exposed to air
Resp. Sens 1, H334- Sensitisation, respiratory, category 1, H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled
Water react. 1, H260- Emission of flammable gases in contact with water, category 1, H260: In contact with water releases flammable gases which may ignite spontaneously
Aqu. Chron. 4, H413- Aquatic environment - long-term hazard, category 4, H413: May cause long lasting harmful effects in the aquatic life

Relevant Precautionary statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

P201: Obtain special instructions before use
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe dust.
P270: Do not eat, drink or smoke when using this product.
P271: Use only in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P284: Wear respiratory protection.
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P314: Get medical advice/attention if you feel unwell.
P333 + P313: If skin irritation occurs: Get medical advice/attention.
P362 + P364: Take off contaminated clothing and wash before reuse.

Relevant R-Phrases (number and full text) referred to in sections 2 and 3 (according to (EC) 67/548/EEC and 1999/45/EC):

T: Toxic
Xn: Harmfull
Xi : Irritant
R40 : Limited evidence of a carcinogenic effect
R48/23 : Danger of serious damage to health by prolonged exposure, Toxic by inhalation
R43 : May cause sensitisation by skin contact
R52/53 : Harmful to aquatic organisms, May cause long-term adverse effects in the aquatic environment
R11: Highly flammable
R17: Spontaneously flammable in air
R42/43: May cause sensitization by inhalation and skin contact
R15: Contact with water liberates extremely flammable gases



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16.2 Further information:

SDS Creation Date: November 5th, 2015

SDS Revision #: 00-C

SDS Revision Date: November 22nd, 2016

Reason for Revision: Added additional P-phrases in accordance to GHS rev 6; Updated 3DSystems logo

www.3dsystems.com

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Safety Data Sheet
According to Hazard Communication Standard 29 CFR 1910.1200 (USA)
LaserForm® Maraging Steel (A)
Revision Date: March 03rd, 2018

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name: LaserForm® Maraging steel
Product type: Solid. [Metallic powder.]

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

For use with 3D Systems DMP (Direct Metal Printing) equipment.

Uses advised against
Any other uses.

1.3 Details of the supplier of the data sheet

3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina
U.S.A.
Phone: 803.326.3900 or
Toll-free Phone: 800.793.3669
e-mail:
moreinfo@3dsystems.com

3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
Herts HP2 7
United Kingdom
Phone: +44 144-2282600
e-mail:
moreinfo@3dsystems.com

3D Systems / Australia
5 Lynch Street
Hawthorn, VIC 3122
+1 03 9819-4422
e-mail:
moreinfo@3dsystems.com

3D Systems Japan K.K.
Ebisu Garden Place Tower 27F
4-20-3, Ebisu, Shibuya-ku,
Tokyo 50-6027 Japan
Telephone No. +81-3-5798-
2500
e-mail:
moreinfo@3dsystems.com

1.4 Emergency telephone number:

USA
Chemical Emergency:
800.424.9300 – Chemtrec

Europe
Chemical Emergency:
+1 703.527.3887 - Chemtrec

Australia
Chemical Emergency:
+(61) 29037.2994 – Aus
Chemtrec

Japan
Chemical Emergency
+(81)-345209637 – Chemtrec

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of substance or mixture

OSHA/HCS status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

2.1.1 Classification

Hazard Class	Category	Statement
EYE IRRITATION	2A	H319
RESPIRATORY SENSITIZATION	1	H334
SKIN SENSITIZATION	1	H317
CARCINOGENICITY	2	H351
TOXIC TO REPRODUCTION (Fertility)	2	H361f
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE)	1	H372
AQUATIC HAZARD (ACUTE)	1	H401
AQUATIC HAZARD (LONG-TERM)	2	H411

2.2 Label Elements

Hazard pictograms:



Signal word:

Danger

Hazard statements:

- H317 : May cause an allergic skin reaction.
- H319 : Causes serious eye irritation.
- H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- H351 : Suspected of causing cancer.
- H372 : Causes damage to organs through prolonged or repeated exposure.
- H361f : Suspected of damaging fertility.
- H400 : Very toxic to aquatic life
- H411 : Toxic to aquatic life with long lasting effects.



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LaserForm® Maraging Steel (A)
 Revision Date: March 03rd, 2018

Precautionary statements:

- P201 : Obtain special instructions before use.
- P202 : Do not handle until all safety precautions have been read and understood.
- P260 : Do not breathe dust.
- P264 : Wash hands thoroughly after handling.
- P270 : Do not eat, drink or smoke when using this product.
- P272 : Contaminated work clothing should not be allowed out of the workplace.
- P273 : Avoid release to the environment.
- P280 : Wear protective gloves, protective clothing and eye protection or face protection.
- P284 : Wear respiratory protection.
- P302+P352 : IF ON SKIN: Wash with plenty of soap and water.
- P304+P340 : IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P305+P351+P338 : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P308+P313 : IF exposed or concerned: Get medical advice/attention.
- P314 : Get medical attention if you feel unwell.
- P333+P313 : If skin irritation or rash occurs: Get medical advice/attention.
- P337+P313 : If eye irritation persists: Get medical advice/attention.
- P342+P311 : If experiencing respiratory symptoms: Call a POISON CENTER or physician.
- P362+P364 : Take off contaminated clothing. And wash it before reuse.
- P391 : Collect spillage.
- P405 : Store locked up.
- P501 : Dispose of contents and container in accordance with all local, regional, national and international regulations.

2.3 Other Hazards which do not result in classification:

None known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture: Mixture

Chemical name	Reach No	CAS-No	EC-No	%	Classification according to Reg. (EC) No. 1272/2008
Iron	01-2119462838-24	7439-89-6	231-096-4	48.5-79.5	Not classified
Nickel	01-2119438727-29	7440-02-0	231-111-4	10-30	Skin send. 1, H317 Car. 2, H351 STOT RE 1, H372 Aquatic Chronic 3, H412
Cobalt		7440-48-4		7-13	Acute Tox. 4, H332 Ey Irrit. 2, H319 Resp. Sens. 1, H334 Skin Sens. 1, H317 Carc. 1, H350i Repr. 2 H361f Aquatic Acute 1, H400 (M=10) Aquatic Chronic 1, H410 (M=1)
Molybdenum	01-2119472304-43	7439-98-7	231-107-2	3-7	Not classified
Titanium		7440-32-6	231-142-3	0.5-1.5	Flam. Sol. 2, H228

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

See section 16 for the full text of the H statements declared above.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.



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SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

- **Following eye contact:** Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- **Following inhalation:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. If suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In the event of any complaints or symptoms, avoid further exposure.
- **Following skin contact:** Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- **Following ingestion:** Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- **Protection of the first aider:** No action shall be taken involving any personal risk or without suitable training. If it suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

- **Eye contact:** Causes serious eye irritation.
- **Inhalation:** Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- **Skin Contact:** May cause an allergic skin reaction.
- **Ingestion:** No known significant effects or critical hazards.

Over-exposure signs/symptoms

- **Eye contact:** Adverse symptoms may include the following: pain or irritation, watering and redness.
- **Inhalation:** Adverse symptoms may include the following: respiratory tract irritation, coughing, wheezing and breathing difficulties, asthma, reduced fetal weight, an increase in fetal deaths, skeletal malformations.
- **Skin contact:** Adverse symptoms may include the following: Irritation, redness, reduced fetal weight, increase in foetal deaths, skeletal malformations
- **Ingestion:** Adverse symptoms may include the following: reduced fetal weight, increase in fetal deaths, skeletal malformations

Long term exposure

- Potential immediate effects : Not available.
- Potential delayed effects : Not available.

4.3 Indications of any immediate medical attention and special treatment needed

- **Notes to physician:** Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- **Specific treatment:** No specific treatment.



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SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media:

- **Suitable extinguishing media:** Use approved type D extinguisher or smother with dry sand, dry clay or dry ground limestone.
- **Unsuitable extinguishing media:** Do not use water nor high volume water jets. Do not use dry chemical, Carbon dioxide (CO₂) or Halon.

5.2 Special hazards arising from the substance or mixture

- **Hazards from the substance or mixture:** This material is very toxic to aquatic life. This material is toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
- **Hazardous thermal decomposition products:** Decomposition products may include the following materials: metal oxide/oxides

5.3 Advise for firefighters:

- **Special protective actions for firefighters:** Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- **Special protective equipment for firefighters:** Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

- **For non-emergency personnel:** No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- **For emergency responders:** if specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

6.2 Environmental precautions

Avoid dispersal of spill material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, or soil). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

6.3 Methods and material for containment and cleaning up

Wear appropriate protective equipment and antistatic clothing.

- **For containment:** Use non-sparking antistatic tools and containers. Do not use compressed air and avoid dust generation.
- **For cleaning up small spillage:** Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
- **For cleaning up large spillage:** Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor.

6.4 Reference to other sections

- See Section 1 for emergency contact information.
- See section 8 for information on appropriate personal protective equipment.
- See section 13 for additional waste treatment information



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SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

- **Protective measures:** Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitisation problems or asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe dust. Do not ingest. Avoid release to the environment. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
- **Advice on general occupational hygiene:** Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Remove contaminated clothing and protective equipment before entering eating areas. Avoid contact with skin and eyes. Do not breathe dust. Wash hands and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage including any incompatibilities

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate container to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

7.3 Specific end use(s)

- **Recommendations:** Not available.
- **Industrial sector specific Solutions** Not available.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limits
nickel	ACGIH TLV (United States, 4/2014). Notes: Refers to Appendix A -- Carcinogens. Inhalable fraction. See Appendix C, paragraph A. Inhalable Particulate Mass TLVs (IPM-TLVs) for those materials that are hazardous when deposited anywhere in the respiratory tract. 1998 Adoption. TWA: 1.5 mg/m ³ 8 hours. Form: Inhalable fraction OSHA PEL (United States, 2/2013). Notes: as Ni TWA: 1 mg/m ³ , (as Ni) 8 hours. NIOSH REL (United States, 10/2013). TWA: 0.015 mg/m ³ , (as Ni) 10 hours.
Cobalt	ACGIH TLV (United States, 3/2016). TWA: 0.02 mg/m ³ , (as Co) 8 hours. TWA: 0.005 mg/m ³ 8 hours. Form: Thoracic fraction NIOSH REL (United States, 10/2013). TWA: 0.05 mg/m ³ , (as Co) 10 hours. Form: Dust and fumes OSHA PEL (United States, 6/2016). TWA: 0.1 mg/m ³ , (as Co) 8 hours.



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8.2 Exposure controls

8.2.1 Appropriate engineering controls

Technical measures to prevent exposure

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. Do not blow dust off clothing or skin with compressed air.

8.2.2 Personal Protection equipment

8.2.2.1 Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

8.2.2.2 Eye and face protection

Safety glasses or goggles are recommended when handling this material.

8.2.2.3 Skin protection

Hand Protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. Rubber or other appropriate gloves should be worn to minimize contact. For hygienic reasons rubber gloves should not be worn for more than 2 hours.

Body protection

Use long sleeved antistatic garments and closed, antistatic safety shoes. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

8.2.2.4 Respiratory protection

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.



8.2.2 Environmental exposure control

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance

Physical state : Solid. [Metallic Powder.]
Colour : Grey.
Odour : Odourless.
Odour threshold : Not available
pH : Not available
Meltingpoint/freezing point : 1370 - 1455°C



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Initial boiling point and boiling range : Not available
Flash point : [Product does not sustain combustion.]
Flammability (solid, gas) : Non-flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and shocks and mechanical impacts.
Explosive properties : Not applicable
20 Liter Screening Test [ASTM E 1226] : Not explosive.
Minimum Ignition Temperature of a Dust Cloud (MAIT) [ASTM E1491] : >1000°C
Percent Combustible Material (PCM) [OSHA NEP Test #3] : The sample oxidized. No values could be determined.
Flammability - Burning rate test [UN - Transport of dangerous goods Test - N.1] : No ignition
Upper/lower flammability or explosive limits : Not available.
Auto-ignition temperature: Not available.
Oxidising properties : Not expected based on chemical composition.
Decomposition temperature: Not available.
Viscosity : Not available.
Evaporation rate : Not available.
Vapour pressure : Not available.
Vapour density : Not available.
Relative density : Not available.
Solubility(ies) : Not available.
Solubility in water (g/l) : Not available.
Partition coefficient: n-octanol/water : Not available.

9.2 Other information
No additional information.

SECTION 10. STABILITY AND REACTIVITY

10.1 Chemical Stability
Stable under normal conditions and under recommended storage conditions.

10.2 Reactivity
No specific test data related to reactivity available for this product or its ingredients.

10.3 Possibility of hazardous reactions
Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid
Store and use away from heat, sparks, open flame or any other ignition source.

10.5 Incompatible materials
Avoid contact with combustible materials, acids, oxidising agents, halogenated hydrocarbons.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Conclusion/Summary : Not available

Irritation/Corrosion
Conclusion/Summary : Not available

Sensitisation
Conclusion/Summary : Not available

Mutagenicity
Conclusion/Summary : Not available

Carcinogenicity

Product/ingredient name	OSHA	IARC	NTP
nickel	-	2B	Reasonably anticipated to be a human carcinogen.
cobalt	-	2B	-

Reproductive toxicity
Conclusion/Summary : Not available



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Teratogenicity

Conclusion/Summary : Not available

Specific target organ toxicity (single exposure)

Conclusion/Summary : Not available

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target Organs
Nickel	Category 1	Not determined	Not determined

Aspiration hazard

Conclusion/Summary : Not available

11.2 Information on the likely routes of exposure

Routes of entry anticipated: oral, dermal, inhalation

11.3 Symptoms related to the physical, chemical and toxicological characteristics

Adverse symptoms may include the following

Eye contact : pain or irritation
watering
redness

Inhalation : respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma
reduced foetal weight
increase in foetal deaths
skeletal malformations

Skin contact : irritation
redness
reduced foetal weight
increase in foetal deaths
skeletal malformations

Ingestion : reduced foetal weight
increase in foetal deaths
skeletal malformations

11.4 Delayed and immediate after short- and long-term exposure

11.4.1 Short term exposure

Potential immediate effects : Not available

Potential delayed effects : Not available

11.4.2 Long term exposure

Potential immediate effects : Not available

Potential delayed effects : Not available

11.5 Potential acute and chronic health effects

11.5.1 Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin contact : May cause an allergic skin reaction

Ingestion : No known significant effects or critical hazards.

11.5.2 Potential chronic health effects

Conclusion/Summary : Not available

General : Causes damage to organs through prolonged or repeated exposure. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.



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Mutagenicity : No known significant effects or critical hazards
Teratogenicity : No known significant effects or critical hazards
Developmental effects : No known significant effects or critical hazards
Fertility effects : No known significant effects or critical hazards

SECTION 12. Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
cobalt	Acute LC50 4400 µg/l	Daphnia – Daphnia magna	48 hours
	Acute LC50 3.4 mg/l Fresh water	Fish – Pimephales promelas	96 hours

12.2 Persistence and degradability

Conclusion/Summary : Not available

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Cobalt	-	15600	high

12.4 Mobility in soil

Soil/water partition coefficient (Koc) : Not available
Mobility : Not available

12.5 Results of PBT and vPvB assessment

PBT : Not applicable
vPvB : Not applicable

12.6 Other adverse effects

No known significant effects or critical hazards

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

13.1.1 Product

Methods of disposal

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

Hazardous waste

The classification of the product may meet the criteria for a hazardous waste.

13.1.2 Packaging

Methods of disposal

Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.


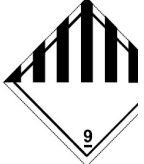


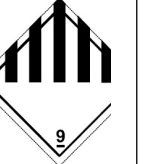

13.2 Special precautions

This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.



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SECTION 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	ADR/RID	IMDG	IATA
UN number	UN3077	UN3077	UN3077	UN3077	UN3077	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (cobalt, Nickel)	Environmentally hazardous substance, solid, n.o.s. (cobalt)	Environmentally hazardous substance, solid, n.o.s. (cobalt)	Environmentally hazardous substance, solid, n.o.s. (cobalt)	Environmentally hazardous substance, solid, n.o.s. (cobalt)	Environmentally hazardous substance, solid, n.o.s. (cobalt)
Transport hazard class(es)	9 	9 	9 	9 	9 	9 
Packing group	III	III	III	III	III	III
Environmental hazards	No.	Yes.	Yes.	Yes.	Yes.	Yes.

Additional information

DOT Classification

Reportable quantity 10 lbs / 4.54 kg. The classification of the product is due solely to the presence of one or more US DOT-listed 'Hazardous substances' that are subject to reportable quantity requirements and only applies to shipments of packages greater than, or equal to, the product reportable quantity. Package sizes less than the product reportable quantity are not regulated as hazardous materials.

Remarks

Subject to 49 CFR Chapter 171.4 (c) (2)

TDG Classification

Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.43-2.45 (Class 9), 2.7 (Marine pollutant mark). Non-bulk packages of this product are not regulated as dangerous goods when transported by road or rail.

Remarks Subject to TDG Special Provision 99 (2)

Mexico Classification

The environmentally hazardous substance mark is not required when transported in sizes of ≤5 L or ≤5 kg.

ADR/RID

This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

Remarks Subject to ADR Special Provision A375

IMDG

This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

Remarks Subject to IMDG Code 37-14 Chapter 2.10.2.7

IATA

This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.

Remarks Subject to IATA Special Provision A 197

Special precautions for user

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

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

Not available.



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SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations

TSCA 8(a) CDR Exempt/Partial exemption: Not determined
Clean Water Act (CWA) 307: Nickel

Clean Air Act

Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed
Section 602 Class I Substances : Not listed
Section 602 Class II Substances : Not listed

DEA

List I Chemicals (Precursor Chemicals) : Not listed
List II Chemicals (Essential Chemicals) : Not listed

SARA

302/304

Composition/information on ingredients : No products were found
304 RQ : Not applicable.

311/312

Classification : Immediate (acute) health hazard
: Delayed (chronic) health hazard

Composition/information on ingredients:

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
nickel	≥10 - ≤25	No.	No.	No.	Yes.	Yes.
cobalt	≥10 - <25	No.	No.	No.	Yes.	Yes.

313

	Product name	CAS number	%
Form – Reporting requirements	Nickel	7440-02-0	≥10 - ≤25
	Cobalt	7440-48-4	≥10 - ≤25
Supplier notification	Nickel	7550-02-0	≥10 - ≤25
	Cobalt	7440-48-4	≥10 - ≤25

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

STATE REGULATIONS

Massachusetts: The following components are listed: NICKEL; COBALT; MOLYBDENUM
New York : The following components are listed: Nickel
New Jersey : The following components are listed: NICKEL; COBALT; MOLYBDENUM; TITANIUM
Pennsylvania : The following components are listed: NICKEL; COBALT FUME; MOLYBDENUM
California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Nickel	Yes.	No.	-	-
Cobalt metal powder	Yes.	No.	-	-

INTERNATIONAL REGULATIONS

Chemical Weapon Convention List Schedules I, II & III Chemicals : Not listed.
Montreal Protocol (Annexes A, B, C, E) : Not listed.
Stockholm Convention on Persistent Organic Pollutants : Not listed.
Rotterdam Convention on Prior Informed Consent (PIC) : Not listed.
UNECE Aarhus Protocol on POPs and Heavy Metals : Not listed.

INVENTORY LIST

United States : All components are listed or exempted.



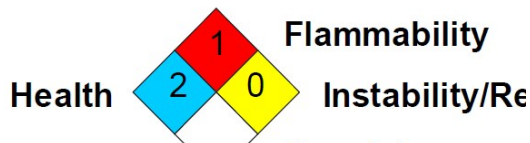
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15.2 Chemical Safety Assessment

This product contains substances for which Chemical Safety Assessments are still required.

SECTION 16. OTHER INFORMATION

National Fire Protection Association (U.S.A.)



Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Abbreviations and acronyms

- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- UN = United Nations

Procedure used to derive the classification

Classification	Justification
Eye Irritation - Category 2A - H319	Calculation method
Respiratory Sensitization - Category 1 - H334	Calculation method
Skin Sensitization - Category 1 - H317	Calculation method
Carcinogenicity - Category 2 - H351	Expert judgment
Toxic to reproduction (fertility) - Category 2 - H361f	Calculation method
Specific Target Organ Toxicity (Repeated Exposure) - Category 1 - H372	Calculation method
Aquatic Hazard (acute) - Category 1 - H400	Calculation method
Aquatic Hazard (long-term) - Category 2 - H411	Calculation method

Full text of abbreviated H statements

- H317 : May cause an allergic skin reaction.
- H319 : Causes serious eye irritation.
- H332 : Harmful if inhaled.
- H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- H350i : May cause cancer if inhaled.
- H351 : Suspected of causing cancer.
- H361f : Suspected of damaging fertility.
- H372 : Causes damage to organs through prolonged or repeated exposure.
- H400 : Very toxic to aquatic life.
- H410 : Very toxic to aquatic life with long lasting effects.
- H411 : Toxic to aquatic life with long lasting effects.
- H412 : Harmful to aquatic life with long lasting effects.

SDS information

- Creation date : October 12th, 2017
- Revision : 00-B
- Revision date : March 03th, 2018
- Revision changes : Addition of H sentence (H400) and explosion/flammability test results.



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LaserForm® Maraging Steel (A)
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Safety Data Sheet
according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® Stainless 316L Type A

Revision Date: November 23rd, 2016

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

1.1 Identification of the mixture: Stainless steel 316L

1.2 Type: Stainless steel, X 2 CrNiMo 17 12 2
Contains the following substances with hazardous properties: Nickel

1.3 Use of the preparation: For use with ProX® DMP 320 Direct Metal Printers

1.4 Uses advised against:

Use of nickel in articles intended for direct and prolonged contact with the skin where the release of nickel exceeds the limit set out in Directives 94/27/EC and 2004/6/EC and REACH regulation 1907/2009 (Annex XVII).

Use of nickel in nickel-containing food contact materials for which migration into foodstuff would exceed more than 0.1 mg/kg of nickel in accordance with the Council of Europe Guidelines on metals and alloys used as food contact materials

Use of nickel in immersion-type kettles which would release more than 0.05 mg/l of nickel into the water in accordance with the Council of Europe Guidelines on metals and alloys used as food contact materials.

Use of nickel in commercially available "do-it-yourself" home electroplating kits.

1.5 Company/undertaking identification:

3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina U.S.A.
Phone: 803.326.3900 or
Toll-free Phone: 800.793.3669
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
800.424.9300 – Chemtrec

3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
Herts HP2 7
United Kingdom
Phone: +44 144-2282600
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
703.527.3887 - Chemtrec

3D Systems / Australia
5 Lynch Street
Hawthorn, VIC 3122
+1 03 9819-4422
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
+(61) 29037.2994 – Aus Chemtrec

2. HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification Regulation (EC) No. 1272/2008, HazCom 29 CFD 1910:

Carcinogenicity	Category 2	H351
Skin Sensitization	Category 1	H317
Aquatic environment - long term hazard	Category 3	H412
Specific target organ toxicity-repeated exposure	Category 1	H372

Regulation (EC) 67/548/EEC and 1999/45/EC:

T; R48/23 Xn; R40 Xi; R43 R52/53

2.2 Label Elements:

Hazard pictograms and signal word (Regulation (EC) No. 1272/2008):



GHS07

GHS08

Signal word: **Danger**



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® Stainless 316L Type A

Revision Date: November 23rd, 2016

Hazard determining components of labelling:

Hazard statements:

H317: May cause an allergic skin reaction
H351: Suspected of causing cancer
H372: Causes damage to organs through prolonged or repeated exposure
H412: Harmful to aquatic life with long lasting effects

Precautionary statements:

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe dust.
P270: Do not eat, drink or smoke when using this product.
P271: Use only in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P284: Wear respiratory protection.
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P314: Get medical advice/attention if you feel unwell.
P333 + P313: If skin irritation occurs: Get medical advice/attention.
P362 + P364: Take off contaminated clothing and wash it before reuse.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical characterization:

Description: Metallic alloy powder

3.2 Dangerous components:

Chemical name	CAS-No	EC-No	%	Classification	
				Regulation 67/548/EEG or 1999/45/EG	Regulation (EC) No. 1272/2008
Nickel	7440-02-0	231-111-4	12.5-13	T R40 R43 R48/23 R52/53	Carc.2, H351 Skin Sens. 1, H 317 STOT RE 1, H372 Aqu.Chron. 3, H412
Chromium	7440-47-3	231-157-5	17.5-18	Not Applicable	Not Applicable
Iron	7439-89-6	231-096-4	63-65	R11	Flam. Sol. 1, H228
Molybdenum	7439-98-7	231-107-2	2.25-2.5	Not Applicable	Not Applicable

4. FIRST AID MEASURES

4.1 General Information: Ensure that eyewash stations and safety showers are close to the workstation location.



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according to Regulation (EC) No 1907/2006 and 1272/2008,
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4.2 Description of First Aid Measures

Skin contact: Wash off thoroughly with soap and water. If rash develops, seek medical attention.

Eye contact: Irrigate thoroughly with water, including under the eyelids, for at least 10-20 minutes. Obtain medical attention if irritation persists.

Inhalation: Move affected person to fresh air, rest and keep warm. In severe cases, if exposure has been great, or if respiratory irritation occurs, obtain medical attention.

Ingestion: Wash out mouth thoroughly with water. Obtain medical attention if further symptoms develop.

4.2 Most important symptoms and effects, both acute and delayed

Skin Contact: Rash may develop.

Eye Contact: Mechanical irritation.

Inhalation: Possible asthma like symptoms.

Ingestion: No information

4.3 Indications of any immediate medical attention and special treatment needed

Skin Contact: Treat symptomatically

Eye Contact: Treat symptomatically

Inhalation: Treat symptomatically

4.6 Self-protection of the first aider: Put on appropriate protective equipment (see section 8). Move exposed person to fresh air.

5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media: The product itself is not flammable. Adapt extinguishing measures to surroundings. Use extinguishing type D powder or sand if available.

5.2 Extinguishing media which must not be used for safety reasons: High volume water jet.

5.3 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases: increased fire hazard during dust formation.

5.4 Special protective equipment for fire-fighters: breathing protection in the presence of dust.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions: Keep unnecessary personnel away. Wear appropriate protective equipment and clothing.

6.2 Environmental precautions: Take precautions to ensure product does not contaminate ground or enter the sewer or drainage system.

6.3 Methods for cleaning up:

Wear appropriate protective equipment and clothing.

For containment: not applicable

For cleaning up small spillage: vacuum with equipment fitted with HEPA or immersion filtration.

For cleaning up large spillage: solids should be carefully transferred to salvage containers. Any residues should be treated as small spillages.

Other information: no information.



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7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures: Work using a suitable extraction/ventilation system.

Measures to prevent fire: Not applicable.

Measures to protect the environment: Use appropriate containment to avoid environmental hazard.

Advice on general occupational hygiene: Avoid contact with skin and eyes. Do not breathe dust. Wash hand and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use.

7.2 Conditions for safe storage

Technical measures and storage conditions: Store in sealed container in dry conditions and keep the container closed when not in use.

Packaging materials: Keep in the container supplied, or suitable metal, plastic or polythene container.

Requirements for storage rooms and vessels: Containers should be stored under cover in a clean and dry environment

Storage class: Not applicable.

Further information on storage conditions: Local regulations should be followed regarding the storage of this material.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:

Exposure limits	OSHA/PEL	ACGIH/TLV
Nickel	1mg/m ³	1.5mg/m ³
Chromium	1 mg/m ³	0.5 mg/m ³
Iron	No exposure limit established	
Molybdenum	15 mg/m ³ *	10 mg/m ³ **

8.2 Exposure controls

Technical measures to prevent exposure:

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. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

Instructual measures to prevent exposure:

Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Wash hands after handling and before eating, smoking and using the lavatory and at the end of the day.



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Personal protection equipment:

Respiratory protection: If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided. Use a dust mask or filter apparatus of minimal level FFP3.

Hand protection: Use impervious nitrile gloves.

Eye protection: Wear safety glasses or chemical goggles.

Body protection: Use long sleeved antistatic garments and closed, antistatic safety shoes.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state: Powder

Colour: Gray

Odour: Odourless

9.2 Important health, safety and environmental information

pH (20 °C):	NA
Melting point/range (°C):	1370 - 1455
Boiling point/range (°C):	No Data
Flash point (°C):	No Data
Ignition temperature (°C):	No Data
Vapour pressure (°C):	No Data
Density (g/cm³):	8
Bulk density (kg/m³):	No Data
Water solubility (20°C in g/l):	No Data
Viscosity:	NA
Auto-ignition temperature:	No Data
Decomposition temperature:	No Data
Dust explosion hazard:	No Data
Explosive properties	No Data
Oxidising properties	No Data
Particle size	100% <1mm

10. STABILITY AND REACTIVITY

10.1 Chemical Stability: Stable under normal conditions and under recommended storage conditions

10.2 Reactivity: No data.

10.3 Possibility of hazardous reactions: No Data

10.4 Conditions to avoid: Prevent formation of dust clouds and accumulation of fines.

10.5 Incompatible materials: oxidizing agents. strong acids and strong bases.

10.6 Hazardous decomposition products: No data.



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11. TOXICOLOGICAL INFORMATION

11.1 Likely Routes of Exposure:

Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

11.2 Symptoms of Exposure:

Fines/dusts may irritate skin and eyes.

11.2 Acute and chronic effects:

Nickel: The most common harmful health effect of metallic nickel in humans is an allergic skin reaction in those who are sensitive to nickel. Although nickel compounds are known human carcinogens, the evidence suggests that the relatively insoluble metallic nickel is less likely to present a carcinogenic hazard than are the nickel compounds that tend to release proportionately more nickel ion.

Chromium: Although much is known about the health effects of chromium compounds, the health effects of chromium metal, Cr(0), is not well studied. Due to insolubility most elements in their metallic state are not considered to be serious health hazards.

Iron: Irritating to the respiratory tract, iron compounds may cause pulmonary fibrosis if dusts are inhaled. Inhalation of large amounts may cause iron pneumoconiosis. Chronic inhalation of finely divided powder may cause chronic iron poisoning and pathological deposition of iron in the body tissue. Ingestion may cause vomiting, diarrhea, pink urine, black stool, and liver damage. Iron compounds may also cause damage to the kidneys.

Molybdenum: No data

Acute Toxicity: No data

Carcinogenicity: Nickel: NTP: R - reasonably anticipated to be a human carcinogen; **IARC:** 2B - possibly carcinogenic to humans

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

12. Ecological information

12.1. Toxicity

Long-term Ecotoxicity May cause long-term adverse effects in the aquatic environment

12.2. Persistence and degradability

Abiotic Degradation No data available

Physical-and photo-chemical elimination No data available

Biodegradation Not readily biodegradable.

12.3. Bioaccumulative potential

Bioconcentration factor (BCF) No data available



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12.4. Mobility in soil

Known or predicted distribution to environmental compartments No data

Adsorption/Desorption No data available

12.7 Additional information

Do not allow product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.

13. DISPOSAL CONSIDERATIONS

13.1 Appropriate disposal / Product: Do not contaminate sewers, drains, soil or surface waters with this material. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with all local, state, and federal regulations.

13.2 Packaging disposal: Consult local and national guidelines for the disposal of discarded packaging.

13.3 Additional information: Prior to disposal 3D Systems recommends consulting your local waste disposal authority or an approved waste disposal firm to ensure regulatory compliance.

14. TRANSPORT INFORMATION

UN Number None

UN proper shipping name Not classified hazardous for transport

Transport hazard class(es) Not applicable

Packing group Not applicable

Environmental hazards May cause long-term adverse effects in the aquatic environment

Special precautions for user None

Transport in bulk according to Annex II of MARPOL73/78 and the IPBC code Not applicable

15. REGULATORY INFORMATION

15.1 EU regulations

EINEC/ELINCS/NLP: All materials are listed

REACH Annex XVII: None listed

15.2 National EU regulations

Wassergefährdungsklasse (water hazard class, Germany): WGK 2: Hazard to waters

15.3. US FEDERAL

TSCA: All materials are listed on the TSCA Inventory or are not subject to TSCA requirements

SARA 302 EHS List (40 CFR 355 Appendix A): None listed

SARA 313 (40 CFR 372.65):

CERCLA (40 CFR 302.4): None listed

15.4 Australian regulations

SUSDP, Industrial Chemicals Act 1989:

Australian Inventory of Chemical Substances, AICS: Listed



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15.5 Japanese regulations

Chemical Substance:	Pneumoconiosis Act Dust Disability Prevention Rules
Iron:	Water Pollution Control Law: Designated Substance
Chromium:	Water Pollution Control Law: Designated Substance PRTR: Chromium and Chromium(III) compounds, Designated Class I Substance, I-87, ≥1% ISHL: Chromium and Chromium(III) compounds, Articles 57-2 and 18-2, Table 9-142, ≥0.1% Air Pollution Control Law: Hazardous Air Pollutants/Priority Initiative No. 49 Waste Disposal and Public Cleaning Law: Article 29
Nickel:	Water Pollution Control Law: Designated Substance PRTR: Nickel, Designated Class I Substance, I-308 ISHL: Nickel and its compounds, Articles 57-2 and 18-2, Table 9-418, ≥0.1% Specific Chemical Substances Disability Prevention Rules: Nickel compounds, 2-23 Clean Air Act: Hazardous Air Pollutants, No. 148 Labor Standards Act: carcinogenic substance (cancer of the upper respiratory tract or lung from working in the smelting or refining of nickel) Ship Safety Act: pyrophoric substances (metal catalyst containing nickel) Aviation Law: pyrophoric substances (metal catalyst containing nickel) Port Regulations Law: pyrophoric substances (metal catalyst containing nickel) Waste Disposal and Public Cleaning Law: Article 30
Molybdenum:	Water Pollution Control Law: Designated Substance Clean Air Act: Hazardous Air Pollutants, No. 243

OTHER INFORMATION

16.1 Relevant Hazard Statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

Skin sens. 1, H 317- Skin sensitization, category 1, H317: May cause an allergic skin reaction
Carc.2, H351- Carcinogenicity, category 2, H351: Suspected of causing cancer
STOT RE 1, H372- Specific target organ toxicity-repeated exposure, category 1, H372: Causes damage to organs through prolonged or repeated exposure
Aqu.Chron. 3, H412- Aquatic environment - long-term hazard, category 3, H412: Harmful to aquatic life with long lasting effects
Flam. Sol.1, H228- Flammable solids, category 1, H228: Flammable solid



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Relevant Precautionary statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

- P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe dust.
P270: Do not eat, drink or smoke when using this product.
P271: Use only in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P284: Wear respiratory protection.
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P314: Get medical advice/attention if you feel unwell.
P333 + P313: If skin irritation occurs: Get medical advice/attention.
P362 + P364: Take off contaminated clothing and wash it before reuse.

Relevant R-Phrases (number and full text) referred to in sections 2 and 3:

- T: Toxic
Xn: Harmful
Xi : Irritant
R11: Highly flammable
R40 : Limited evidence of a carcinogenic effect
R48/23 : Danger of serious damage to health by prolonged exposure, Toxic by inhalation
R43 : May cause sensitisation by skin contact
R52/53 : Harmful to aquatic organisms, May cause long-term adverse effects in the aquatic environment

16.2 Further information:

SDS Creation Date: November 5th, 2015

SDS Revision #:00-B

SDS Revision Date: November 23rd, 2016

Reason for Revision: added additional P-phrases in accordance to GHS guidelines rev 6; Updated 3DSystems Logo

www.3dsystems.com

800.793.3669 (Toll-free in the US GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

803.326.3900 (Outside the U.S. GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

+44 144-2282600 (Europe GMT+01:00; Mon – Fri, 08:00 a.m. - 17:00 p.m. MEZ)

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LaserForm® Stainless 17-4PH Type A

Revision Date: July 27th, 2016

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

1.1 Identification of the mixture: Stainless steel 17-4PH

1.2 Type: Stainless steel, UNS S17400, DIN 1.4542
Contains the following substances with hazardous properties: Nickel

1.3 Use of the preparation: For use with ProX® DMP 320 Direct Metal Printers

1.4 Uses advised against:

Use of nickel in articles intended for direct and prolonged contact with the skin where the release of nickel exceeds the limit set out in Directives 94/27/EC and 2004/6/EC and REACH regulation 1907/2009 (Annex XVII).

Use of nickel in nickel-containing food contact materials for which migration into foodstuff would exceed more than 0.1 mg/kg of nickel in accordance with the Council of Europe Guidelines on metals and alloys used as food contact materials

Use of nickel in immersion-type kettles which would release more than 0.05 mg/l of nickel into the water in accordance with the Council of Europe Guidelines on metals and alloys used as food contact materials.

Use of nickel in commercially available "do-it-yourself" home electroplating kits.

1.5 Company/undertaking identification:

3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina U.S.A.
Phone: 803.326.3900 or
Toll-free Phone: 800.793.3669
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
800.424.9300 – Chemtrec

3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
Herts HP2 7 United Kingdom
Phone: +44 144-2282600
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
703.527.3887 - Chemtrec

3D Systems / Australia
5 Lynch Street
Hawthorn, VIC 3122
+1 03 9819-4422
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
+(61) 29037.2994 – Aus Chemtrec

2. HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification Regulation (EC) No. 1272/2008, HazCom 29 CFD 1910:

Skin Sensitization	Category 1	H317
Carcinogenicity	Category 2	H351
Specific target organ toxicity-repeated exposure	Category 1	H372
Aquatic environment - long term hazard	Category 3	H412

Regulation (EC) 67/548/EEC and 1999/45/EC:

T; Xn; Xi; R20; R40; R43; R48/23; R52/53

2.2 Label Elements:

Hazard pictograms and signal word (Regulation (EC) No. 1272/2008):



GHS07

GHS08

Signal word: Danger



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Hazard determining components of labelling:

Hazard statements:

H317: May cause an allergic skin reaction
H351: Suspected of causing cancer
H372: Causes damage to organs through prolonged or repeated exposure
H412: Harmful to aquatic life with long lasting effects

Precautionary statements:

P201: Obtain special instructions before use
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe dust.
P270: Do not eat, drink or smoke when using this product.
P273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P333 + P313: If skin irritation occurs: Get medical advice/attention.
P363: Wash contaminated clothing before reuse.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical characterization:

Description: Metallic alloy powder

3.2 Dangerous components:

Chemical name	CAS-No	EC-No	%	Classification	
				Regulation 67/548/EEG or 1999/45/EG	Regulation (EC) No. 1272/2008
Nickel	7440-02-0	231-111-4	4-5	T R40 R43 R48/23 R52/53	Carc.2, H351 Skin Sens. 1, H317 STOT RE 1, H372 Aqu.Chron. 3, H412
Chromium	7440-47-3	231-157-5	16-17	Not Applicable	Not Applicable
Iron	7439-89-6	231-096-4	72-77	R11	Flam. Sol. 1, H228
Molybdenum	7439-98-7	231-107-2	<0.3	Not Applicable	Not Applicable
Copper	7440-50-8	231-1596	3.5-4.5	R11 R20 R51 R52/53	Flam. Sol. 1, H228 Aqu.Acute. 1, H400 Aqu.Chron. 3, H412



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4. FIRST AID MEASURES

4.1 General Information: Ensure that eyewash stations and safety showers are close to the workstation location.

4.2 Description of First Aid Measures

Skin contact: Wash off thoroughly with soap and water. If rash develops, seek medical attention.

Eye contact: Irrigate thoroughly with water, including under the eyelids, for at least 10-20 minutes. Obtain medical attention if irritation persists.

Inhalation: Move affected person to fresh air, rest and keep warm. In severe cases, if exposure has been great, or if respiratory irritation occurs, obtain medical attention.

Ingestion: Wash out mouth thoroughly with water. Obtain medical attention if further symptoms develop.

4.2 Most important symptoms and effects, both acute and delayed

Skin Contact: Rash may develop.

Eye Contact: Mechanical irritation.

Inhalation: Possible asthma like symptoms.

Ingestion: No information

4.3 Indications of any immediate medical attention and special treatment needed

Skin Contact: Treat symptomatically

Eye Contact: Treat symptomatically

Inhalation: Treat symptomatically

4.6 Self-protection of the first aider: Put on appropriate protective equipment (see section 8). Move exposed person to fresh air.

5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media: The product itself is not flammable. Adapt extinguishing measures to surroundings. Use extinguishing type D powder or sand if available.

5.2 Extinguishing media which must not be used for safety reasons: High volume water jet.

5.3 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases: increased fire hazard during dust formation.

5.4 Special protective equipment for fire-fighters: breathing protection in the presence of dust.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions: Keep unnecessary personnel away. Wear appropriate protective equipment and clothing.

6.2 Environmental precautions: Take precautions to ensure product does not contaminate ground or enter the sewer or drainage system.

6.3 Methods for cleaning up:

Wear appropriate protective equipment and clothing.

For containment:	not applicable
For cleaning up small spillage:	vacuum with equipment fitted with HEPA or immersion filtration.
For cleaning up large spillage:	solids should be carefully transferred to salvage containers. Any residues should be treated as small spillages.
Other information:	no information.



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7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures:	Work using a suitable extraction/ventilation system.
Measures to prevent fire:	Not applicable.
Measures to protect the environment:	Use appropriate containment to avoid environmental hazard.
Advice on general occupational hygiene:	Avoid contact with skin and eyes. Do not breathe dust. Wash hand and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use.

7.2 Conditions for safe storage

Technical measures and storage conditions:	Store in sealed container in dry conditions and keep the container closed when not in use.
Packaging materials:	Keep in the container supplied, or suitable metal, plastic or polythene container.
Requirements for storage rooms and vessels:	Containers should be stored under cover in a clean and dry environment
Storage class:	Not applicable.
Further information on storage conditions:	Local regulations should be followed regarding the storage of this material.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:

Exposure limits	OSHA/PEL	ACGIH/TLV
Nickel	1mg/m ³	1.5mg/m ³
Chromium	1 mg/m ³	0.5 mg/m ³
Iron	No exposure limit established	
Molybdenum	15 mg/m ³ *	10 mg/m ³ **
Copper	1 mg/m ³	1 mg/m ³

8.2 Exposure controls

Technical measures to prevent exposure:

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. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

Instructional measures to prevent exposure:

Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Wash hands after handling and before eating, smoking and using the lavatory and at the end of the day.

Personal protection equipment:

Respiratory protection: If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided. Use a dust mask or filter apparatus of minimal level FFP3 or N99.

Hand protection: Use impervious nitrile gloves.

Eye protection: Wear safety glasses or chemical goggles.

Body protection: Use long sleeved antistatic garments and closed, antistatic safety shoes.





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9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state: Powder

Colour: Gray

Odour: Odourless

9.2 Important health, safety and environmental information

pH (20 °C):	NA
Melting point/range (°C):	1400-1440
Boiling point/range (°C):	No Data
Flash point (°C):	No Data
Ignition temperature (°C):	No Data
Vapour pressure (°C):	No Data
Density (g/cm³):	7.8
Bulk density (kg/m³):	No Data
Water solubility (20°C in g/l):	No Data
Viscosity:	NA
Auto-ignition temperature:	No Data
Decomposition temperature:	No Data
Dust explosion hazard:	No Data
Explosive properties	No Data
Oxidising properties	No Data
Particle size	100% <1mm

10. STABILITY AND REACTIVITY

10.1 Chemical Stability: Stable under normal conditions and under recommended storage conditions

10.2 Reactivity: No data.

10.3 Possibility of hazardous reactions: No Data

10.4 Conditions to avoid: Prevent formation of dust clouds and accumulation of fines.

10.5 Incompatible materials: oxidizing agents. strong acids and strong bases.

10.6 Hazardous decomposition products: No data.

11. TOXICOLOGICAL INFORMATION

11.1 Likely Routes of Exposure:

Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

11.2 Symptoms of Exposure:

Fines/dusts may irritate skin and eyes.

11.2 Acute and chronic effects:

Nickel: The most common harmful health effect of metallic nickel in humans is an allergic skin reaction in those who are sensitive to nickel. Although nickel compounds are known human carcinogens, the evidence suggests that the relatively insoluble metallic nickel is less likely to present a carcinogenic hazard than are the nickel compounds that tend to release proportionately more nickel ion.

Chromium: Although much is known about the health effects of chromium compounds, the health effects of chromium metal, Cr(0), is not well studied. Due to insolubility most elements in their metallic state are not considered to be serious health hazards.



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Iron: Irritating to the respiratory tract, iron compounds may cause pulmonary fibrosis if dusts are inhaled. Inhalation of large amounts may cause iron pneumoconiosis. Chronic inhalation of finely divided powder may cause chronic iron poisoning and pathological deposition of iron in the body tissue. Ingestion may cause vomiting, diarrhea, pink urine, black stool, and liver damage. Iron compounds may also cause damage to the kidneys.

Molybdenum: No data

Copper: No data

Acute Toxicity: No data

Carcinogenicity: **Nickel:** NTP: R - reasonably anticipated to be a human carcinogen; **IARC:** 2B - possibly carcinogenic to humans

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

12. Ecological information

12.1. Toxicity

Long-term Ecotoxicity May cause long-term adverse effects in the aquatic environment

12.2. Persistence and degradability

Abiotic Degradation	No data available
Physical-and photo-chemical elimination	No data available
Biodegradation	Not readily biodegradable.

12.3. Bioaccumulative potential

Bioconcentration factor (BCF) No data available

12.4. Mobility in soil

Known or predicted distribution to environmental compartments	No data
Adsorption/Desorption	No data available

12.7 Additional information

Do not allow product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.

13. DISPOSAL CONSIDERATIONS

13.1 Appropriate disposal / Product: Do not contaminate sewers, drains, soil or surface waters with this material. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with all local, state, and federal regulations.

13.2 Packaging disposal: Consult local and national guidelines for the disposal of discarded packaging.

13.3 Additional information: Prior to disposal 3D Systems recommends consulting your local waste disposal authority or an approved waste disposal firm to ensure regulatory compliance.



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm® Stainless 17-4PH Type A

Revision Date: July 27th, 2016

14. TRANSPORT INFORMATION

UN Number	None
UN proper shipping name	Not classified hazardous for transport
Transport hazard class(es)	Not applicable
Packing group	Not applicable
Environmental hazards	May cause long-term adverse effects in the aquatic environment
Special precautions for user	None
Transport in bulk according to Annex II of MARPOL73/78 and the IPBC code	Not applicable

15. REGULATORY INFORMATION

15.1 EU regulations

EINEC/ELINCS/NLP: All materials are listed
REACH Annex XVII: None listed

15.2 National EU regulations

Wassergefährdungsklasse (water hazard class, Germany): WGK 2: Hazard to waters

15.3. US FEDERAL

TSCA: All materials are listed on the TSCA Inventory or are not subject to TSCA requirements
SARA 302 EHS List (40 CFR 355 Appendix A): None listed
SARA 313 (40 CFR 372.65):
CERCLA (40 CFR 302.4): None listed

15.4 Australian regulations

SUSDP, Industrial Chemicals Act 1989:
Australian Inventory of Chemical Substances, AICS: Listed

15.5 Japanese regulations

Chemical Substance:	Pneumoconiosis Act Dust Disability Prevention Rules
Iron:	Water Pollution Control Law: Designated Substance
Chromium:	Water Pollution Control Law: Designated Substance PRTR: Chromium and Chromium(III) compounds, Designated Class I Substance, I-87, ≥1% ISHL: Chromium and Chromium(III) compounds, Articles 57-2 and 18-2, Table 9-142, ≥0.1% Air Pollution Control Law: Hazardous Air Pollutants/Priority Initiative No. 49 Waste Disposal and Public Cleaning Law: Article 29
Nickel:	Water Pollution Control Law: Designated Substance PRTR: Nickel, Designated Class I Substance, I-308 ISHL: Nickel and its compounds, Articles 57-2 and 18-2, Table 9-418, ≥0.1% Specific Chemical Substances Disability Prevention Rules: Nickel compounds, 2-23 Clean Air Act: Hazardous Air Pollutants, No. 148 Labor Standards Act: carcinogenic substance (cancer of the upper respiratory tract or lung from working in the smelting or refining of nickel) Ship Safety Act: pyrophoric substances (metal catalyst containing nickel) Aviation Law: pyrophoric substances (metal catalyst containing nickel) Port Regulations Law: pyrophoric substances (metal catalyst containing nickel) Waste Disposal and Public Cleaning Law: Article 30
Molybdenum:	Water Pollution Control Law: Designated Substance Clean Air Act: Hazardous Air Pollutants, No. 243
Copper:	Water Pollution Control Law: Designated Substance



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OTHER INFORMATION

16.1 Relevant Hazard Statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

Skin sens. 1, H 317 - Skin sensitization, category 1, H317: May cause an allergic skin reaction

Carc.2, H351- Carcinogenicity, category 2, H351: Suspected of causing cancer

STOT RE 1, H372 - Specific target organ toxicity-repeated exposure, category 1, H372: Causes damage to organs through prolonged or repeated exposure

Aqu.Chron. 3, H412 - Aquatic environment - long-term hazard, category 3, H412: Harmful to aquatic life with long lasting effects

Flam. Sol.1, H228 - Flammable solids, category 1, H228: Flammable solid

Aqu.Acute 1, H400 – Aquatic Environment – Acute hazard, category 1, H400: Very toxic to aquatic life

Relevant Precautionary statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

P201: Obtain special instructions before use

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust.

P270: Do not eat, drink or smoke when using this product.

P273: Avoid release to the environment

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P302 + P352: IF ON SKIN: Wash with plenty of soap and water.

P333 + P313: If skin irritation occurs: Get medical advice/attention.

P363: Wash contaminated clothing before reuse.

Relevant R-Phrases (number and full text) referred to in sections 2 and 3:

T: Toxic

Xn: Harmfull

Xi: Irritant

R11: Highly flammable

R20: Harmful by inhalation

R40: Limited evidence of a carcinogenic effect

R43: May cause sensitisation by skin contact

R48/23: Danger of serious damage to health by prolonged exposure, Toxic by inhalation

R51: Toxic to aquatic organisms

R52/53: Harmful to aquatic organisms, May cause long-term adverse effects in the aquatic environment

16.2 Further information:

SDS Creation Date: July 27th, 2016

SDS Revision #:00-A

SDS Revision Date:/

Reason for Revision:/

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800.793.3669 (Toll-free in the US GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

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Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm™ Ti Gr. 1 Type A

Revision Date: February 25th, 2016

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

- 1.1 Identification of the mixture:** Titanium grade 1
Titanium grade 2
- 1.2 Type:** Commercially pure Titanium
- 1.3 Use of the preparation:** For use with ProX® 320 printers
- 1.4 Uses advised against:** No data
- 1.5 Company/undertaking identification:**
- | | | |
|---|---|---|
| 3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina U.S.A.
Phone: 803.326.3900 or
Toll-free Phone: 800.793.3669
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Chemical Emergency:
+(61) 29037.2994 – Aus Chemtrec |
|---|---|---|

2. HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification (29 CFR 1910.1200) :

Regulation (EC) No. 1272/2008, HazCom 29 CFD 1910:

Flammable solids	Category 1	H228
------------------	------------	------

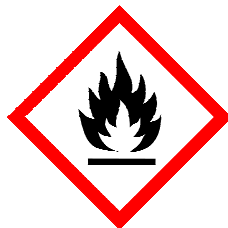
Regulation (EC) 67/548/EEC and 1999/45/EC:

F, R11

2.2 Label Elements

Regulation (EC) No. 1272/2008:

Hazard pictograms and signal word:



GHS02

Signal word: Danger

Hazard determining components of labelling: Titanium

Hazard statements:

H228: Flammable solid



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

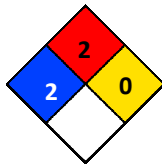
LaserForm™ Ti Gr. 1 Type A

Revision Date: February 25th, 2016

Precautionary statements:

P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P231: Handle under inert gas.
P241: Use explosion-proof electrical and ventilating equipment.
P280: Wear protective gloves, clothing and eye protection.
P370+378: In case of fire: Use dry sand or Class D fire extinguisher to extinguish.
P402+404: Store in a dry place. Store in a closed container.
P422: Store contents under inert gas.

NFPA rating



NFPA Ratings

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Hazardous Materials Identification System (HMIS):

(Degree of hazard: 0 = low, 4 = extreme):

Health 2
Flammability 2
Physical Hazards 0

Personal Protection:

Skin, eye protection

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical characterization:

Description: Metallic alloy powder

3.2 Dangerous components:

Chemical name	CAS-No	EC-No	%	Classification	
				Regulation 67/548/EEG or 1999/45/EG	Regulation (EC) No. 1272/2008
Titanium	7440-32-6	231-142-3	88.5-91.5	F, R11, R17	Pyr. Sol..1, H250 Flam. Sol.1, H228

4. FIRST AID MEASURES

4.1 General Information: Ensure that eyewash stations and safety showers are close to the workstation location.

4.2 Description of First Aid Measures:

Skin contact: Wash off thoroughly with soap and water. Remove and dispose of or properly launder contaminated clothing before wearing again.

Eye contact: Irrigate gently but thoroughly, including under the eyelids, with water for at least 10 to 20 minutes. Obtain medical attention if irritation persists.

Inhalation: 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.

Ingestion: Wash out mouth thoroughly with water.



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Revision Date: February 25th, 2016

4.2 Most important symptoms and effects, both acute and delayed:

Skin Contact: No information.
Eye Contact: Mechanical irritation.
Inhalation: Mechanical irritation of airways
Ingestion: No information

4.3 Indications of any immediate medical attention and special treatment needed:

Eye Contact: Treat symptomatically
Inhalation: Treat symptomatically

4.6 Self-protection of the first aider: Put on appropriate protective equipment (see section 8). Move exposed person to fresh air.

5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media: The product itself is flammable and can spontaneously ignite when mixed with air. Adapt extinguishing measures to surroundings. Use extinguishing type D powder, dry salt or sand if available. Carbon dioxide is not effective.

5.2 Extinguishing media which must not be used for safety reasons: Do not use water (explosion hazard), including high volume water jets, Carbon dioxide (Titanium burns in carbon dioxide above 550°C) or Halon.

5.3 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases: increased fire hazard during dust formation.

5.4 Special protective equipment for fire-fighters: Wear breathing protection in the presence of dust and suitable antistatic garments.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions: Keep unnecessary personnel away and contact emergency personnel. Wear appropriate protective equipment and clothing. Remove all sources of ignition.

6.2 Environmental precautions: Take precautions to ensure product does not contaminate ground or enter the sewer or drainage system.

6.3 Methods for cleaning up: Wear appropriate protective equipment and antistatic clothing.

For 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.
Other information:	Do not use compressed air. Prevent the formation of dust clouds.



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Revision Date: February 25th, 2016

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures:	Work using a suitable extraction/ventilation system. Use non-sparking explosion proof tools. Wear suitable antistatic garments and respiration protection.
Measures to prevent fire:	Prevent the formation of dust clouds. Avoid all sources of ignition.
Measures to protect the environment:	Use appropriate containment to avoid environmental hazard.
Advice on general occupational hygiene:	Avoid contact with skin and eyes. Do not breathe dust. Wash hand and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use.

7.2 Conditions for safe storage

Technical measures and storage conditions:	Store under inert gas in a sealed antistatic container in dry and cool conditions and keep the container closed when not in use.
Packaging materials:	Keep in the container supplied, or suitable metal, antistatic plastic or polythene container.
Requirements for storage rooms and vessels:	Containers should be stored in a fire proof cabinet or room in a clean, cool and dry environment.
Storage class:	Class 4.1 (Flammable solid)
Further information on storage conditions:	Local regulations should be followed regarding the storage of this material.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:

Exposure limits	OSHA/PEL	ACGIH/TLV
Titanium	No limit	10 mg/m ³ (as TiO ₂)

8.2 Exposure controls

Technical measures to prevent exposure:

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. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

Instructual measures to prevent exposure:

Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Wash hands after handling and before eating, smoking and using the lavatory and at the end of the day.



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according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm™ Ti Gr. 1 Type A

Revision Date: February 25th, 2016

Personal protection equipment:

Respiratory protection: If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided. Use a dust mask or filter apparatus of minimal level FFP1.

Hand protection: Use impervious nitrile gloves.

Eye protection: Wear safety glasses or chemical goggles.

Body protection: Use long sleeved antistatic garments and closed, antistatic safety shoes.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state: Powder

Colour: Silver/Gray

Odour: Odourless

9.2 Important health, safety and environmental information

pH (20 °C):	NA
Melting point/range (°C):	1 675
Boiling point/range (°C):	No Data
Flash point (°C):	No Data
Ignition temperature (°C):	No Data
Vapour pressure (°C):	No Data
Density (g/cm³):	4.5
Bulk density (kg/m³):	No Data
Water solubility (20°C in g/l):	No Data
Viscosity:	NA
Auto-ignition temperature (°C):	480 (fine particles in cloud form)
Decomposition temperature:	No Data
Dust explosion hazard:	Fine dust clouds may form explosive mixtures with air
Explosive properties:	No Data
Oxidising properties:	No Data
Particle size:	100% <1mm



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
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LaserForm™ Ti Gr. 1 Type A

Revision Date: February 25th, 2016

10. STABILITY AND REACTIVITY

10.1 Chemical Stability: Stable under normal conditions and under recommended storage conditions

10.2 Reactivity: Titanium and titanium alloys may oxidize slowly when exposed to air.

10.3 Possibility of hazardous reactions: Titanium reacts with halogens, 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.

10.4 Conditions to avoid: Prevent formation of dust clouds and accumulation of fines. Static electricity, heat or ignition source.

10.5 Incompatible materials: oxidizing agents, strong acids and strong bases, halogenated hydrocarbons and other combustible materials.

10.6 Hazardous decomposition products: None.

11. TOXICOLOGICAL INFORMATION

11.1 Likely Routes of Exposure:

Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

11.2 Symptoms of Exposure:

Fines/dusts may irritate airways and eyes.

11.2 Acute and chronic effects:

Titanium: No scientific data is available on the toxicity of titanium. Titanium is considered to be inert. This product is also not considered to be mutagenic, teratogenic or carcinogenic.

Acute Toxicity: No data available

12. Ecological information

12.1. Toxicity

Long-term Ecotoxicity No data available

12.2. Persistence and degradability

Abiotic Degradation No data available

Physical-and photo-chemical elimination No data available

Biodegradation Not readily biodegradable.

12.3. Bioaccumulative potential

Bioconcentration factor (BCF) No data available

12.4. Mobility in soil

Known or predicted distribution to environmental compartments No data

Adsorption/Desorption No data available



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm™ Ti Gr. 1 Type A

Revision Date: February 25th, 2016

12.7 Additional information

Do not allow product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.

13. DISPOSAL CONSIDERATIONS

13.1 Appropriate disposal / Product: Do not contaminate sewers, drains, soil or surface waters with this material. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with all local, state, and federal regulations.

13.2 Packaging disposal: Consult local and national guidelines for the disposal of discarded packaging.

13.3 Additional information: Prior to disposal 3D Systems recommends consulting your local waste disposal authority or an approved waste disposal firm to ensure regulatory compliance.

14. TRANSPORT INFORMATION

UN Number UN3089

UN proper shipping name Metal powders, Flammable, n.o.s. (Spherical Ti powder <45µm)

Transport hazard class(es) Class 4.1 (Flammable solid)

Packing group II

Label



Environmental hazards Not applicable

Special precautions for user Prevent heat sources and sources of ignition

Transport in bulk according to Annex II of MARPOL73/78 and the IPBC code Not applicable

15. REGULATORY INFORMATION

15.1 EU regulations:

EINEC/ELINCS/NLP: All materials are listed
REACH Annex XVII: None listed

15.2. US FEDERAL:

TSCA: All materials are listed on the TSCA Inventory or are not subject to TSCA requirements
SARA 302 EHS List (40 CFR 355 Appendix A): None listed
SARA 313 (40 CFR 372.65):
CERCLA (40 CFR 302.4): None listed



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm™ Ti Gr. 1 Type A

Revision Date: February 25th, 2016

15.3. Australian regulations:

SUSDP, Industrial Chemicals Act 1989:
Australian Inventory of Chemical Substances, AICS: Listed

15.4 Canadian regulations

WHMIS Classification: Class B-4 – Flammable Solids
WHMIS Symbol:



15.5. Japanese regulations:

Industrial Health and Safety Law	not applicable
Hazardous material	not applicable
Organic solvent poison prevention rule	not applicable
Ordinance on prevention of hazard due to specified chemical substances	not applicable
Lead Poisoning Prevention Rule	not applicable
Poison and Deleterious Substance Control law	not applicable
Management law (PRTR Law)	not applicable
Fire Services Act	flammable solid
Explosives Law	explosive dust
High pressure gas safety law	not applicable
Export Trade Control Order	not applicable
Ship Safety Act:	Combustible material, pyrophoric substance
Aviation Law:	Transport ban, combustible material, pyrophoric substance (194-1)
Waste Disposal and Public Cleaning Law	Before disposal, consult an approved waste disposal operative to ensure regulatory compliance

16. OTHER INFORMATION

16.1 Relevant Hazard Statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

Flam. Sol.1, H228- Flammable solids, category 1, H228: Flammable solid

Pyr. Sol. 1, H250- Pyrophoric solids, category 1, H250: Catches fire spontaneously if exposed to air



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm™ Ti Gr. 1 Type A

Revision Date: February 25th, 2016

Relevant Precautionary statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P231: Handle under inert gas.
P241: Use explosion-proof electrical and ventilating equipment.
P280: Wear protective gloves, clothing and eye protection.
P370+378: In case of fire: Use dry sand or Class D fire extinguisher to extinguish.
P402+404: Store in a dry place. Store in a closed container.
P422: Store contents under inert gas.

Relevant R-Phrases (number and full text) referred to in sections 2 and 3:

F : Highly Flammable
R11 : Highly flammable
R17: Spontaneously flammable in air

16.2 Further information:

SDS Creation Date: November 5th, 2015
SDS Revision #: 01-A
SDS Revision Date: February 25th, 2016
Reason for Revision: Correction R-, H- and P- phrases

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803.326.3900 (Outside the U.S. GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

+44 144-2282600 (Europe GMT+01:00; Mon – Fri, 08:00 a.m. - 17:00 p.m. MEZ)

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WHS Regulations Australia,
JIS Z 7253 (2012) Japan

LaserForm™ Ti Gr. 23 Type A / LaserForm™ Ti Gr. 5 Type A

Revision Date: February 25th, 2016

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

- 1.1 Identification of the mixture:** Titanium grade 5, Ti6Al4V
Titanium grade 23, Ti6Al4V ELI
- 1.2 Type:** Ti6Al4V alloy
- 1.3 Use of the preparation:** For use with ProX® 320 printers
- 1.4 Uses advised against:** No data
- 1.5 Company/undertaking identification:**
- | | | |
|---|---|---|
| 3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina U.S.A.
Phone: 803.326.3900 or
Toll-free Phone: 800.793.3669
e-mail: moreinfo@3dsystems.com
Chemical Emergency:
800.424.9300 – Chemtrec | 3D Systems Europe Ltd.
Mark House, Mark Road
Hemel Hempstead
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e-mail: moreinfo@3dsystems.com
Chemical Emergency:
+(61) 29037.2994 – Aus Chemtrec |
|---|---|---|

2. HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification (29 CFR 1910.1200) :

Regulation (EC) No. 1272/2008, HazCom 29 CFD 1910:

Flammable solids	Category 1	H228
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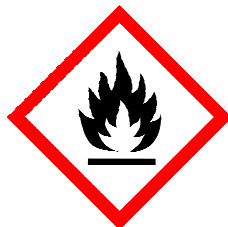
Regulation (EC) 67/548/EEC and 1999/45/EC:

F, R11

2.2 Label Elements

Regulation (EC) No. 1272/2008:

Hazard pictograms and signal word:



GHS02

Signal word: Danger

Hazard determining components of labelling: Titanium, Aluminium

Hazard statements:

H228: Flammable solid.



Safety Data Sheet

according to Regulation (EC) No 1907/2006 and 1272/2008,
Hazard Communication Standard 29 CFR 1910 (USA),
WHS Regulations Australia,
JIS Z 7253 (2012) Japan

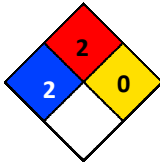
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Precautionary statements:

P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P231: Handle under inert gas.
P241: Use explosion-proof electrical and ventilating equipment.
P280: Wear protective gloves, clothing and eye protection.
P370+378: In case of fire: Use dry sand or Class D fire extinguisher to extinguish.
P402+404: Store in a dry place. Store in a closed container.
P422: Store contents under inert gas.

NFPA rating



NFPA Ratings

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Hazardous Materials Identification System (HMIS):

(Degree of hazard: 0 = low, 4 = extreme):

Health 2
Flammability 2
Physical Hazards 0

Personal Protection:

Skin, eye protection

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical characterization:

Description: Metallic alloy powder

3.2 Dangerous components:

Chemical name	CAS-No	EC-No	%	Classification	
				Regulation 67/548/EEG or 1999/45/EG	Regulation (EC) No. 1272/2008
Titanium	7440-32-6	231-142-3	88.5-91.5	R11, R17, F	Pyr. Sol.1, H250 Flam. Sol.1, H228
Aluminum	7429-90-5	231-072-3	5-7	T, F, R11, R15	Water react. 2, H261 Flam. Sol.1, H228
Vanadium	7440-62-2	231-171-1	3.5-4.5	Not Applicable	Not Applicable

4. FIRST AID MEASURES

4.1 General Information: Ensure that eyewash stations and safety showers are close to the workstation location.



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4.2 Description of First Aid Measures:

Skin contact: Wash off thoroughly with soap and water. Remove and dispose of or properly launder contaminated clothing before wearing again.

Eye contact: Irrigate gently but thoroughly, including under the eyelids, with water for at least 10 to 20 minutes. Obtain medical attention if irritation persists.

Inhalation: 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.

Ingestion: Wash out mouth thoroughly with water.

4.2 Most important symptoms and effects, both acute and delayed:

Skin Contact: No information.

Eye Contact: Mechanical irritation.

Inhalation: Mechanical irritation of airways

Ingestion: No information

4.3 Indications of any immediate medical attention and special treatment needed:

Eye Contact: Treat symptomatically

Inhalation: Treat symptomatically

4.6 Self-protection of the first aider: Put on appropriate protective equipment (see section 8). Move exposed person to fresh air.

5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media: The product itself is flammable and can spontaneously ignite when mixed with air. Adapt extinguishing measures to surroundings. Use extinguishing type D powder, dry salt or sand if available. Carbon dioxide is not effective.

5.2 Extinguishing media which must not be used for safety reasons: Do not use water (explosion hazard), including high volume water jets, Carbon dioxide (Titanium burns in carbon dioxide above 550°C) or Halon.

5.3 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases: Increased fire hazard during dust formation.

5.4 Special protective equipment for fire-fighters: Wear breathing protection in the presence of dust and suitable antistatic garments.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions: Keep unnecessary personnel away and contact emergency personnel. Wear appropriate protective equipment and clothing. Remove all sources of ignition.

6.2 Environmental precautions: Take precautions to ensure product does not contaminate ground or enter the sewer or drainage system.

6.3 Methods for cleaning up: Wear appropriate protective equipment and antistatic clothing.

For 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.
Other information:	Do not use compressed air. Prevent the formation of dust clouds.



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7. HANDLING AND STORAGE

7.1 Precautions for safe handling:

Protective measures:	Work using a suitable extraction/ventilation system. Use non-sparking explosion proof tools. Wear suitable antistatic garments and respiration protection.
Measures to prevent fire:	Prevent the formation of dust clouds. Avoid all sources of ignition.
Measures to protect the environment:	Use appropriate containment to avoid environmental hazard.
Advice on general occupational hygiene:	Avoid contact with skin and eyes. Do not breathe dust. Wash hand and face thoroughly after working with material. Contaminated clothing should be removed and washed before re-use.

7.2 Conditions for safe storage:

Technical measures and storage conditions:	Store under inert gas in a sealed antistatic container in dry and cool conditions and keep the container closed when not in use.
Packaging materials:	Keep in the container supplied, or suitable metal, antistatic plastic or polythene container.
Requirements for storage rooms and vessels:	Containers should be stored in a fire proof cabinet or room in a clean, cool and dry environment.
Storage class:	Class 4.1 (Flammable solid)
Further information on storage conditions:	Local regulations should be followed regarding the storage of this material.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:

Exposure limits	OSHA/PEL	ACGIH/TLV
Titanium	No limit	10 mg/m ³ (as TiO ₂)
Aluminium	No limit	5 mg/m ³ (Fumes)
Vanadium	0.5/ 0.1 mg/m ³ (dust/fume)	0.05 mg/m ³ (as V ₂ O ₅)

8.2 Exposure controls

Technical measures to prevent exposure:

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. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

Instructual measures to prevent exposure:

Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Wash hands after handling and before eating, smoking and using the lavatory and at the end of the day.



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Personal protection equipment:

Respiratory protection: If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided. Use a dust mask or filter apparatus of minimal level FFP1.

Hand protection: Use impervious nitrile gloves.

Eye protection: Wear safety glasses or chemical goggles.

Body protection: Use long sleeved antistatic garments and closed, antistatic safety shoes.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance:

Physical state: Powder

Colour: Silver/Gray

Odour: Odourless

9.2 Important health, safety and environmental information:

pH (20 °C):	NA
Melting point/range (°C):	1 605 to 1 665
Boiling point/range (°C):	3287
Flash point (°C):	No Data
Ignition temperature (°C):	No Data
Vapour pressure (°C):	No Data
Density (g/cm³):	4.43
Bulk density (kg/m³):	No Data
Water solubility (20°C in g/l):	No Data
Viscosity:	NA
Auto-ignition temperature (°C):	480 (fine particles in cloud form)
Decomposition temperature:	No Data
Dust explosion hazard:	Fine dust clouds may form explosive mixtures with air
Explosive properties:	No Data
Oxidising properties:	No Data
Particle size:	100% <1mm

10. STABILITY AND REACTIVITY

10.1 Chemical Stability: Stable under normal conditions and under recommended storage conditions

10.2 Reactivity: Titanium and titanium alloys may oxidize slowly when exposed to air.



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10.3 Possibility of hazardous reactions: Titanium reacts with halogens, 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.

10.4 Conditions to avoid: Prevent formation of dust clouds and accumulation of fines. Static electricity, heat or ignition source.

10.5 Incompatible materials: oxidizing agents, strong acids and strong bases, halogenated hydrocarbons and other combustible materials.

10.6 Hazardous decomposition products: None.

11. TOXICOLOGICAL INFORMATION

11.1 Likely Routes of Exposure:

Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

11.2 Symptoms of Exposure:

Fines/dusts may irritate airways and eyes.

11.2 Acute and chronic effects:

Titanium: No scientific data is available on the toxicity of titanium. Titanium is considered to be inert. This product is also not considered to be mutagenic, teratogenic or carcinogenic.

Aluminium: No scientific data is available on the toxicity of aluminum. Aluminum is considered to be relatively inert. This product is also not considered to be mutagenic, teratogenic or carcinogenic.

Vanadium: No scientific data is available on the toxicity of vanadium. Vanadium is considered to be relatively inert. This product is also not considered to be mutagenic, teratogenic or carcinogenic. Vanadium is suspected to be tumorigenic according to RTECS: possibility of causing tumors at the area of exposure.

Acute Toxicity: No data available

12. Ecological information

12.1. Toxicity

Long-term Ecotoxicity No data available

12.2. Persistence and degradability

Abiotic Degradation No data available

Physical-and photo-chemical elimination No data available

Biodegradation Not readily biodegradable.

12.3. Bioaccumulative potential

Bioconcentration factor (BCF) No data available



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12.4. Mobility in soil

Known or predicted distribution to environmental compartments	No data
Adsorption/Desorption	No data available

12.7 Additional information

Do not allow product to enter drains. Do not flush into surface water. Do not let product contaminate subsoil.

13. DISPOSAL CONSIDERATIONS

13.1 Appropriate disposal / Product: Do not contaminate sewers, drains, soil or surface waters with this material. Reduce waste by attempting to utilize product completely. Dispose of this container and its contents in accordance with all local, state, and federal regulations.

13.2 Packaging disposal: Consult local and national guidelines for the disposal of discarded packaging.

13.3 Additional information: Prior to disposal 3D Systems recommends consulting your local waste disposal authority or an approved waste disposal firm to ensure regulatory compliance.

14. TRANSPORT INFORMATION

UN Number	UN3089
UN proper shipping name	Metal powders, Flammable, n.o.s. (Spherical Ti6Al4V powder <45µm)
Transport hazard class(es)	Class 4.1 (Flammable solid)
Packing group	II
Label	



Environmental hazards	Not applicable
Special precautions for user	Prevent heat sources and sources of ignition
Transport in bulk according to Annex II of MARPOL73/78 and the IPBC code	Not applicable

15. REGULATORY INFORMATION

15.1 EU regulations

EINEC/ELINCS/NLP: All materials are listed
REACH Annex XVII: None listed

15.2 National EU regulations

Not applicable



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15.3. US FEDERAL

TSCA: All materials are listed on the TSCA Inventory or are not subject to TSCA requirements
SARA 302 EHS List (40 CFR 355 Appendix A): None listed
SARA 313 (40 CFR 372.65): None listed
CERCLA (40 CFR 302.4): None listed

15.4 Australian regulations

SUSDP, Industrial Chemicals Act 1989:
Australian Inventory of Chemical Substances, AICS: Listed

15.5 Canadian regulations

WHMIS Classification: Class B-4 – Flammable Solids
WHMIS Symbol:



15.6 Japanese regulations

Industrial Health and Safety Law	Dangerous substances (Combustible substances: Titanium powder, Aluminium powder)
Hazardous material	not applicable
Organic solvent poison prevention rule	not applicable
Ordinance on prevention of hazard due to specified chemical substances	not applicable
Lead Poisoning Prevention Rule	not applicable
Poison and Deleterious Substance Control law	not applicable
Management law (PRTR Law)	not applicable
Fire Services Act	flammable solid
Explosives Law	explosive dust
High pressure gas safety law	not applicable
Export Trade Control Order	not applicable
Ship Safety Act:	Combustible material, pyrophoric substance
Aviation Law:	Transport ban, combustible material, pyrophoric substance (194-1)
Waste Disposal and Public Cleaning Law	Before disposal, consult an approved waste disposal operative to ensure regulatory compliance



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16. OTHER INFORMATION

16.1 Relevant Hazard Statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

Flam. Sol.1, H228- Flammable solids, category 1, H228: Flammable solid

Pyr. Sol. 1, H250- Pyrophoric solids, category 1, H250: Catches fire spontaneously if exposed to air

Water react. 2, H261- Emission of flammable gases in contact with water, category 2, H261: In contact with water releases flammable gas

Relevant Precautionary statements (number and full text) referred to in sections 2 and 3 (according to (EC) No. 1272/2008):

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P280: Wear protective gloves, clothing and eye protection.

P370+378: In case of fire: Use dry sand or Class D fire extinguisher to extinguish.

P402+404: Store in a dry place. Store in a closed container.

P422: Store contents under inert gas.

Relevant R-Phrases (number and full text) referred to in sections 2 and 3:

F : Highly Flammable

R11 : Highly flammable

R15 : Contact with water liberates extremely flammable gases

R17: Spontaneously flammable in air

16.2 Further information:

SDS Creation Date: November 5th, 2015

SDS Revision #:01-A

SDS Revision Date: February 25th, 2016

Reason for Revision: Correct R-, H- and P-Phrases

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