



**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 27<sup>th</sup>, 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 <sup>3</sup>	1.5mg/m <sup>3</sup>
Chromium	1 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>
Iron	No exposure limit established	
Molybdenum	15 mg/m <sup>3</sup> *	10 mg/m <sup>3</sup> **
Copper	1 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>

#### 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

<b>pH (20 °C):</b>	NA
<b>Melting point/range (°C):</b>	1400-1440
<b>Boiling point/range (°C):</b>	No Data
<b>Flash point (°C):</b>	No Data
<b>Ignition temperature (°C):</b>	No Data
<b>Vapour pressure (°C):</b>	No Data
<b>Density (g/cm<sup>3</sup>):</b>	7.8
<b>Bulk density (kg/m<sup>3</sup>):</b>	No Data
<b>Water solubility (20°C in g/l):</b>	No Data
<b>Viscosity:</b>	NA
<b>Auto-ignition temperature:</b>	No Data
<b>Decomposition temperature:</b>	No Data
<b>Dust explosion hazard:</b>	No Data
<b>Explosive properties</b>	No Data
<b>Oxidising properties</b>	No Data
<b>Particle size</b>	100% <1mm

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### 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.



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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

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

### 12.3. Bioaccumulative potential

**Bioconcentration factor (BCF)** No data available

### 12.4. Mobility in soil

<b>Known or predicted distribution to environmental compartments</b>	No data
<b>Adsorption/Desorption</b>	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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### 14. TRANSPORT INFORMATION

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

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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 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

<b>Chemical Substance:</b>	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 27<sup>th</sup>, 2016

SDS Revision #: .....00-A

SDS Revision Date: ...../

Reason for Revision: ...../

[www.3dsystems.com](http://www.3dsystems.com)

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