

Material Name: LaserForm A6

I. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product/Trade Name: LaserForm™ A6
Chemical Family: Metal Powder
Product Use: Material for SLS® (selective laser sintering) systems

Hazardous Materials Identification System (HMIS):

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

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

Personal Protection:

Dust mask, skin, eye protection

Manufacturer:



Manufacturer Contact	3D Systems GmbH Guerickeweg 9 Darmstadt, Germany
For Information	Phone: +49 (0) 6151 357-357 Fax: +49 (0) 6151 357-111
Emergency	703.527.3887 - Chemtrec (U.S.)

II. COMPOSITION INFORMATION

EC #	Component	Classification	Percent
231-157-5	Chromium (CAS# 7440-47-3)	Xi R36/37/38	<1.81
231-111-4	Nickel (CAS# 7440-02-0)	Xn R40 R43	<0.905
231-158-0	Cobalt (CAS# 7440-48-4)	Xn R42/43 R53	<0.905
231-105-1	Manganese (CAS# 7439-96-5)		<1.81

General Product Information

This preparation is classified as hazardous according to European Union Directives 67/548/EEC and 99/45/EC.

Xn R43

III. HAZARDS IDENTIFICATION

Emergency Overview

This preparation can cause an allergic skin reaction. Prolonged or multiple exposures can cause skin sensitisation. Can cause eye, skin, and respiratory tract irritation. Dusts or fume can cause respiratory system damage. The metal alloy contains a substance that can cause nervous system effects.

Potential Health Effects:

Eyes: This product can cause eye irritation. Symptoms include discomfort, itching and redness after contact.

Skin: This product can cause skin irritation. Symptoms include reversible redness, itching and/or pain.

Ingestion: Ingestion of large amounts can cause gastrointestinal irritation, vomiting, diarrhea and/or nausea.

Inhalation: This product can irritate the respiratory system. Symptoms include mild nasal and respiratory irritation, coughing, and difficulty breathing. Inhalation of fumes when the product is heated can cause metal fume fever with resulting flu-like symptoms.

Chronic: Prolonged or repeated inhalation of powder, dust or fumes can cause more severe irritation and possibly lung damage. Prolonged or repeated exposures to chromium dusts or fumes may cause perforation of the nasal septum, bloody nose and other symptoms of severe nasal irritation. Chronic exposure to very high concentrations of manganese dust has caused nervous system effects including muscle weakness, tremors, and behavioral changes. Epidemiological studies in humans have shown an association between lung and nasal cancers and prolonged occupational exposures to high concentrations of metallic nickel. While metallic nickel has been identified as a possible health hazard under extended exposure to large concentrations, the nickel in this product is in low concentration and is alloyed with other metals. The particles are also coated with a binder, further reducing the risk of exposure to nickel.



VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

A: General Product Information: Follow all applicable exposure limits.

B: Substance Exposure Limits:

Substance	International OELs
Chromium	Finland: 0.01 mg/m ³ Australia: 0.05 mg/m ³ Belgium, Denmark, France, Netherlands, Norway, Poland, Sweden, Japan, U.K (MEL): 0.5 mg/m ³ Philippines: 1 mg/m ³
Manganese	<u>Canada</u> Alberta (TWA): 1 mg/m ³ (fume); Ceiling: 5 mg/m ³ Manitoba (TWA): 1 mg/m ³ (fume); STEL: 3 mg/m ³ (fume); Ceiling: 5 mg/m ³ (dust) New Brunswick, Ontario (TWA): 1 mg/m ³ (fume), 5 mg/m ³ (dust); STEL: 3 mg/m ³ (fume) Quebec (TWAEV): 1 mg/m ³ (fume), 5 mg/m ³ (dust) Saskatchewan (TWA): 5 mg/m ³ (as Mn); 1 mg/m ³ (TWA); STEL: 5 mg/m ³ (elemental), 3 mg/m ³ (fume) Yukon: Ceiling 5 mg/m ³ Belgium, Denmark, Finland, France, Switzerland, U.K. – 1 mg/m ³ Sweden – 2.5 mg/m ³ Germany (MAK) – 0.5 mg/m ³
Nickel	<u>Canada</u> Alberta (TWA): 1 mg/m ³ STEL: 1 mg/m ³ Manitoba, New Brunswick, Ontario (TWA): 1 mg/m ³ Quebec (TWAEV): 1 mg/m ³ British Columbia (TWA): 0.05 mg/m ³ ; K1 (confirmed human carcinogen); sensitizer – reduce exposure to minimum possible level

Engineering Controls

Use explosion-proof local exhaust ventilation. Ventilation should effectively remove and prevent buildup of any dust generated from the handling of this product.

PERSONAL PROTECTIVE EQUIPMENT

- Eyes/Face: Wear goggles.
- Skin: Use impervious gloves and apron.
- Respiratory: If ventilation cannot effectively keep dust concentrations below established limits, appropriate certified respiratory protection must be provided.
- General: An eye wash fountain is recommended.

IX. PHYSICAL AND CHEMICAL PROPERTIES

Appearance.....	Silver/Gray Powder	Odor.....	Metallic
Physical State.....	Powder	PH.....	NA
Vapour Pressure	NA	Vapour Density	NA
Boiling Point	NA	Melting/Freezing Point	NA
Solubility (H ₂ O)	insoluble @ 20 °C	Specific Gravity	NA
Percent Volatile	<1%	Molecular Weight	NA

X. CHEMICAL STABILITY AND REACTIVITY

Chemical Stability:	Stable under normal conditions of handling, use and transportation.
Conditions to Avoid:	Avoid dispersion of dust in air. Avoid ignition sources where dust is produced. Avoid contact with moist air or humid conditions.
Incompatibility:	Oxidizing materials, strong acids and strong bases.
Hazardous Decomposition:	Thermal decomposition products can include CO ₂ , CO, NO _x , metal fumes, organo-metallic compounds, and smoke.
Hazardous Polymerization:	Will not occur.

XI. TOXICOLOGICAL INFORMATION**Acute and Chronic Toxicity**

A: General Product Information: NA.

B: Component Analysis

Component	LD ₅₀ Oral	LC ₅₀ Inhalation
Chromium	27.5 mg/Kg (rats)	86 mg/m ³ (rats)
Manganese	9 g/Kg (rats)	no data

Chromium: In some workers, chromium compounds act as allergens and may cause dermatitis and/or pulmonary sensitisation. Chromic acid and chromates have a direct corrosive effect on the skin and the mucous membranes of the upper respiratory tract. Although rare, there may be the possibility of skin and pulmonary sensitisation.

Cobalt: Cobalt has been reported as causing hyper-sensitisation type dermatitis in individuals who are susceptible. Animal studies have shown that particulate cobalt is an acutely irritating substance and industrial exposures, possibly combined with small amounts of silica, are reported capable of producing serious pneumoconiosis.

Nickel: The most common ailment arising from contact with nickel or its compounds is an allergic dermatitis known as "nickel itch" which usually occurs when the skin is moist.

Since these substances are all part of a metal alloy, exposure to elemental metals is highly unlikely, and they are not expected to pose the afore mentioned health-hazards in this product.

Carcinogenicity

A: General Product Information: This product is not listed by IARC.

B: Component Analysis

Nickel: In laboratory animal studies, chronic exposure to high concentrations of metallic nickel has caused an increase in lung and nasal tumors. IARC has classified nickel as possibly carcinogenic to humans, group 2B. The National Toxicology Program (NTP) classifies metallic nickel as "Reasonably Anticipated to be a Human Carcinogen." Nickel-containing alloys have not been listed by NTP as carcinogenic due to inadequacy of the data. The form of this product and the alloy structure make it highly unlikely that exposure to metallic nickel will occur.

Chromium: IARC has determined that there is sufficient evidence of increased lung cancer among workers in the chromate-producing industry and possible chromium alloy workers. This determination is supported by sufficient evidence for carcinogenicity to animals and possible mutagenicity testing of Cr VI compounds. The form of this product and the alloy structure make it highly unlikely that exposure to elemental chromium or Cr VI compounds will occur.

Neurological Effects

A: General Product Information: This product is not known or reported to cause neurological effects.

B: Component Analysis

Manganese: Chronic exposure to very high concentrations of manganese dust has caused nervous system effects including muscle weakness, tremors, and behavioral changes in humans. The form of this product and the alloy structure make it highly unlikely that exposure to metallic manganese will occur.

XII. ECOLOGICAL INFORMATION

Ecotoxicity

A: General Product Information: This product is not classified as dangerous to the environment.
 B: Component Analysis - Ecotoxicity - Aquatic Toxicity: No ecotoxicity data are available for this product.
 Mobility – No information available for product.
 Persistence & Degradation – No information available for product.
 Bioaccumulation – No information available for product.
 Other Adverse Effects – No information available for product.
 Environmental Fate: No information available for product.

XIII. DISPOSAL CONSIDERATIONS

Waste Disposal Instructions

Avoid disposal. Attempt to utilize preparation completely. Prior to disposal of unused preparation, consult an approved waste disposal operative to ensure regulatory compliance.

XIV. TRANSPORT INFORMATION

	US DOT	RID/ADR	IMDG	IATA	IMO	Canada TDG
Shipping Name	Not Regulated					
Hazard Class:						
UN Number:						
Packing Group:						

XV. REGULATORY INFORMATION

European Union Regulatory Information

General Product Information: This substance is not classified according to European Union Directive 67/548/EEC

- Xn Harmful
- R43 May cause sensitisation by skin contact.
- S22 Do not breathe dust.
- S23 Do not breathe fumes.
- S24/25 Avoid contact with skin and eyes.
- S36/37 Wear suitable protective clothing and gloves.

Component Analysis - Inventory

Component/CAS	EC #	EEC	CAN	TSCA	NLP
Chromium (CAS# 7440-47-3)	231-157-5	EINECS	DSL	Yes	No
Nickel (CAS# 7440-02-0)	231-111-4	EINECS	DSL	Yes	No
Cobalt (CAS# 7440-48-4)	231-158-0	EINECS	DSL	Yes	No
Manganese (CAS# 7439-96-5)	231-105-1	EINECS	DSL	Yes	No

XVI. ADDITIONAL INFORMATION

Full text of all Risk Phrases in Sections 2 & 3

EC#	Component/CAS	Classification
231-157-5	Chromium (CAS# 7440-47-3)	Xi Irritant R36/37/38 Irritating to eyes, respiratory system and skin.
231-111-4	Nickel (CAS# 7440-02-0)	Xn Harmful R40 Limited evidence of a carcinogenic effect. R43 May cause sensitisation by skin contact.
231-158-0	Cobalt (CAS# 7440-48-4)	Xn Harmful R42/43 May cause sensitisation by inhalation and skin contact. R53 May cause long-term adverse effects in the aquatic environment.



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MSDS Revision Date: n/a
Reason for Revision: n/a
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Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists

CAS = Chemical Abstracts Service

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = Code of Federal Regulations

CPR = Controlled Products Regulations

DOT = Department of Transportation

DSL = Domestic Substances List

EINECS = European Inventory of Existing Commercial Chemical Substances

EPA = Environmental Protection Agency

IARC = International Agency for Research on Cancer

IATA = International Air Transport Association

IDL = Ingredients Disclosure List

mg/Kg = milligrams per Kilogram

mg/L = milligrams per Liter

mg/m³ = milligrams per Cubic Meter

MSHA = Mine Safety and Health Administration

NA = Not Applicable or Not Available

NIOSH = National Institute for Occupational Safety and Health

NJTSP = New Jersey Trade Secret Registry

NTP = National Toxicology Program

OSHA = Occupational Safety and Health Administration

SARA = Superfund Amendments and Reauthorization Act

STEL = Short Term Exposure Limit

TDG = Transport Dangerous Goods

TSCA = Toxic Substances Control Act

WHMIS = Workplace Hazardous Materials Information System.