

I. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product/Trade Name: LaserForm™ A6 Steel Material
Chemical Family: Metal mixture
Product Use: Tool steel composite powder for SLS® system laser sintering applications

Hazardous Materials Identification System (HMIS):	
<small>(Degree of hazard: 0 = low, 4 = extreme);</small>	
Health	1
Flammability	0
Physical Hazards	0
National Fire Protection Association (NFPA):	
Mixture, Not Rated	

Manufacturer:



	In the U.S./Canada	In Europe
Manufacturer Contact	3D Systems, Inc. 26081 Avenue Hall Valencia, CA 91355 U.S.A.	3D Systems GmbH Guerickeweg 9 D-64291 Darmstadt, Germany
For Information:	Phone: 970.257.4700 or Toll-free Phone: 800.793.3669	Phone: +49 (0) 6151 357-357 Fax: +49 (0) 6151 357-111
Emergency:	800.424.9300 - Chemtrec	703.527.3887 - Chemtrec (U.S.)

II. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Chemical Name	Percent	EINECS/ ELINCS #	EU Classification	
				Symbol	R-Phrase
7439-89-6	Iron	60 - 100	231-096-4	None	None
12070-12-1	Tungsten Carbide	5 - 10	235-123-0	Xi	R 36/37
7440-47-3	Chromium	1 - 5	231-157-5	Xi	R37
7439-96-5	Manganese	1 - 5	231-105-1	None	None
7439-98-7	Molybdenum	1 - 5	231-107-2	None	None
7440-02-0	Nickel	0.1 - 1	231-111-4	Xn	R 40-43

OSHA Classification: Irritant, neurotoxin

III. HAZARDS IDENTIFICATION

WARNING! MAY CAUSE EYE AND RESPIRATORY TRACT IRRITATION. DUST, FUME OR POWDER CAN CAUSE RESPIRATORY SYSTEM DAMAGE. CONTAINS A MATERIAL WHICH CAN CAUSE NERVOUS SYSTEM EFFECTS. AVOID CONTACT WITH EYES, SKIN AND CLOTHING. KEEP CONTAINER CLOSED. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

FOR INDUSTRIAL USE ONLY.

Potential Health Effects

- EYE:** May cause irritation consisting of redness, swelling and pain due to mechanical irritation. May cause conjunctivitis with repeated exposures.
- SKIN:** Material not expected to be absorbed through the skin. May cause slight irritation consisting of redness and/or swelling due to mechanical irritation.
- INHALATION:** Harmful if inhaled. Exposure to high concentrations of chromium dusts or fumes can cause severe respiratory and nasal irritation.
- INGESTION:** Ingestion of large amounts may cause nausea, diarrhea and/or stomach pain.



CHRONIC: Prolonged or repeated inhalation of powder, dust or fume may 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 the steel particles which are then coated with a binder, further reducing the risk of exposure to nickel.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

May aggravate existing asthma, neurological conditions, emphysema, or other respiratory disease.

POTENTIAL ENVIRONMENTAL EFFECTS: None known or expected.

IV. FIRST AID MEASURES

Skin contact: Wipe with absorbent paper or textile towels. Wash with plenty of soap and water. Do not use organic solvents. In case of dermatitis, seek medical attention.

Eye contact: Rinse immediately with water for at least 15 minutes. Seek medical attention immediately.

Inhalation: Move affected person to fresh air. In case of unconsciousness, rest in stable lateral position (recovery position). In case of asphyxia, initiate artificial respiration immediately. Seek medical attention immediately.

Ingestion: Affected person should drink 500 - 800 ml water, if possible with suspended activated carbon for medical use. In case of spontaneous vomiting, be sure that vomitus can freely drain because of danger of suffocation. Give water repeatedly. Artificial induction of vomiting should be restricted to first aid staff. Give nothing by mouth in case of unconsciousness or convulsions. Seek medical attention.

Notes to Physician: Treat symptomatically and supportively.

V. FIRE FIGHTING MEASURES

Flashpoint: Not applicable

Extinguishing Media: Dry sand or NFPA-approved Class D extinguisher. Without disturbing the burning mass, smother the fire and allow the fire to burn itself out. DO NOT USE CO₂ extinguishers or water on metal powder fire.

Unusual Fire or Explosion

Hazard: None. Fire or explosion may result by exposing any concentrated dust suspensions to a spark or flame.

Protective Equipment: Self-contained breathing apparatus (SCBA) and protective clothing.

VI. ACCIDENTAL RELEASE MEASURES

Carefully collect all material, place in a suitable, labeled container and dispose of according to local and national regulations. Clean-up personnel should wear protective clothing, goggles and NIOSH-approved respirators. Use non-sparking equipment to vacuum up the spilled powder and avoid formation of dust clouds. A substantial slipping hazard exists when these small spherical particles are spilled.

VII. HANDLING AND STORAGE

Handling: Avoid spilling powders to prevent slip hazards. Clean spills immediately. Wash after use and before eating, drinking, or smoking.

Storage: Keep containers tightly closed. Store in the original container at room temperature and away from moisture. Store away from any incompatible materials. Keep away from food and drink.

VIII. EXPOSURE CONTROLS, PERSONAL PROTECTION

CAS #	Chemical Name	ACGIH TLV	OSHA PEL	International OELs
7439-89-6	Iron	None established	None established	Ontario, Canada: 5 mg/m ³
12070-12-1	Tungsten Carbide	5 mg/m ³ STEL: 10 mg/m ³	None established	Austria, Belgium, Denmark, Finland, Netherlands, Norway, Poland, Sweden, Switzerland, U.K.: 5 mg/m ³
7440-47-3	Chromium	0.5 mg/m ³	1 mg/m ³	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
7439-96-5	Manganese	0.2 mg/m ³	Ceiling – 5 mg/m ³	Canada 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 (TWA EV): 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
7439-98-7	Molybdenum	10 mg/m ³ (inhalable) 3 mg/m ³ (respirable)	None established	None established
7440-02-0	Nickel	1.5 mg/m ³ (inhalable)	1 mg/m ³	Canada: Alberta (TWA): 1 mg/m ³ STEL: 1 mg/m ³ Manitoba, New Brunswick, Ontario (TWA): 1 mg/m ³ Quebec (TWA EV): 1 mg/m ³ British Columbia (TWA): 0.05 mg/m ³ ; K1 (confirmed human carcinogen); sensitizer – reduce exposure to minimum possible level

Personal Protective

Equipment:

Wear gloves and eye protection when handling. Provide local exhaust ventilation or general dilution ventilation to maintain exposure levels below the PEL, TLV, or TWA. If exposures above the PEL/TLV/TWA are possible, use a NIOSH-approved dust mask or respirator.

Ventilation:

General and local exhaust ventilation, engineering controls and good housekeeping practices are recommended to keep dust concentrations below the permissible exposure limits.

Other Protective

Equipment:

Eye wash should be available in the immediate work area.



IX. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Silver/gray powder
 Boiling point: Not available
 Solubility in water: Insoluble
 Vapor pressure: Not applicable
 Partition Coefficient: Not applicable
 Explosive Properties: Not explosive
 Odor: Odorless
 Specific Gravity: Not available
 Flashpoint: Not flammable
 Ignition: Not applicable
 pH-Value: Not applicable
 Viscosity: Not applicable

X. STABILITY AND REACTIVITY

Stability: Stable in dry air at room temperature (20°C).
 Conditions or materials to avoid: Contact with moist air or humid conditions, or generation of airborne dust. Incompatible with moisture, acids, oxidizers and bases.
 Hazardous decomposition products: Thermal decomposition or burning may release oxides of carbon and other toxic or irritating gases or vapors.
 Hazardous Polymerization: Will not occur.

XI. TOXICOLOGICAL INFORMATION

For Product:		For Components (> 1%):				
		Iron	Chromium	Tungsten Carbide	Manganese	Molybdenum
Oral LD ₅₀	Believed to be > 5 g/kg	30 g/kg (rat)	27.5 mg/kg (rat)	9 g/kg (rat)	9 g/kg (rat)	No Data
Dermal LD ₅₀	Believed to be > 2 g/kg	No data	No data	No Data	No Data	No Data
Inhalation LC ₅₀	Believed to be slightly toxic	No data	86 mg/m ³ (4 hours, rat)	No Data	No Data	70 mg/kg 9 rat, (intratracheal)
Irritation	Believed to be a mild eye and respiratory irritant	Eye irritant	Respiratory tract and nasal irritant	Mild eye and skin irritant	Mild eye and skin irritant	No Data
Sensitization	Not anticipated to be a sensitizer	No data	No data	No data	No data	Not a sensitizer

Subchronic/Chronic Toxicity Data: Chronic ingestion of large amounts of molybdenum has caused effects in animals including anemia and liver damage. These effects are due to molybdenum’s ability to affect normal copper metabolism when ingested at very high concentrations and not due to a direct effect from molybdenum itself.

Mutagenicity: No information for product.

Carcinogenicity: In laboratory animal studies, chronic exposure to high concentrations of metallic nickel has caused an increase in lung and nasal tumors. The International Agency for Research on Cancer (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.” The form of nickel in this material is as an alloy which has 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.



Reproductive, Teratogenicity,
Or Developmental Effects:

The product is not known or reported to cause reproductive or developmental effects.

Neurological Effects:

This product is not known or reported to cause neurological effects. Chronic exposure to very high concentrations of manganese dust has caused nervous system effects including muscle weakness, tremors, and behavioral changes in humans.

Interactions With Other Chemicals

Which Enhance Toxicity:

None known or reported.

XII. ECOLOGICAL INFORMATION

The aquatic toxicity of the product is unknown, however, based on components, it is not predicted that this material would be toxic to aquatic organisms or cause long-term adverse effects in the aquatic environment.

XIII. DISPOSAL CONSIDERATIONS

Incineration or landfill in accordance with applicable EU, national, or local regulations.

XIV. TRANSPORT INFORMATION

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

XV. REGULATORY INFORMATION

US FEDERAL

TSCA: All materials are listed on the TSCA Inventory
 CERCLA: Chromium, R.Q.* = 5,000 lbs.; Nickel, R.Q.* = 100 lbs.
 SARA 313: Chromium, Nickel, Manganese
 SARA 312 Hazard Class: Health: Acute – Yes Chronic - Yes
Fire: No
Sudden Release of Pressure: No
 SARA 302 EHS List: None of the components are listed

*R.Q. – Reportable Quantity

STATE RIGHT-TO-KNOW STATUS

Component	CA Prop. 65	Michigan	New Jersey	Pennsylvania	Massachusetts
Nickel	X	X	X	X	X
Molybdenum	Not listed	Not listed	X	X	Not listed
Chromium	Not listed	X	X	X	X
Manganese	Not listed	X	X	X	Not listed
Tungsten Carbide	Not listed	Not listed	Not listed	Not listed	Not listed
Iron	Not listed	Not listed	Not listed	Not listed	Not listed

EUROPEAN/INTERNATIONAL REGULATIONS

Hazard Classification

Danger Symbol: Xi
 Risk Phrases: R 36/37 Irritating to eyes and respiratory system.
 Safety Phrases: S 22 Do not breathe dust.
 S 43 In case of fire use sand.
 S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

Contains Chromium, Tungsten Carbide



Canadian DSL List: The components of this product are on the DSL or are exempt from reporting under the New Substances Notification Regulations.

Canadian IDL: Chromium, Manganese, Molybdenum, Nickel, Tungsten compounds

WHMIS: D2A; D2B. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

German WGK Classification: Not hazardous to waters.

XVI. ADDITIONAL INFORMATION

MSDS Creation Date: 12/13/02

MSDS Revision #: 5

MSDS Revision Date: 6/4/03

Reason for Revision: To update product information

For more information: 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.)
970.257.4700 (Outside the U.S. GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)
+49 (0) 6151 357-357 (Europe GMT+01:00; Mon – Fri, 08:00 a.m. - 17:00 p.m. MEZ)

DISCLAIMER OF LIABILITY: The following supersedes any provision in your company's forms, letters, and papers. 3D Systems, Inc. makes no warranty whether expressed or implied, including warranties of merchantability or of fitness for a particular purpose for this product. No statements or recommendations contained in the product literature are to be construed as inducements to infringe any relevant patent now or hereafter in existence. Under no circumstances shall 3D Systems, Inc. be liable for incidental, consequential, or other damages from alleged negligence, breach or warranty, strict liability or any other theory, arising out of the use or handling of this product. The sole liability of 3D Systems, Inc. for any claims arising out of the manufacture, use or sale of its products shall be for the buyer's purchase price.

© Copyright 2003 by 3D Systems, Inc. All rights reserved. Subject to change without notice. The 3D Systems logo and SLS are registered trademarks, LaserForm is a trademark, and "the solid imaging company" is a service mark of 3D Systems, Inc.