

SAFETY DATA SHEET

LaserForm AlSi10Mg (A)

Section 1. Chemical product and company identification

- A. Product name** : LaserForm AlSi10Mg (A)
- B. Relevant identified uses of the substance or mixture and uses advised against**
- Product use** : For use with 3D Systems' Direct Metal Printing equipment.
- C. Manufacturer / Importer / Distributor** : 3D Systems, Inc.
333 Three D Systems Circle
Rock Hill, South Carolina, USA
- Phone: +1 803 326 3900 or
Toll-free Phone: +1 800 793 3669
- e-mail address of person responsible for this SDS** : moreinfo@3dsystems.com
- Emergency telephone number of the company** : ☎ 1 703 527 3887 (Chemtrec, worldwide)

Section 2. Hazards identification

- A. Hazard classification** : Not classified.
This product was evaluated in accordance with the Industrial Safety and Health Act and the Chemical Control Act, and determined to be 'not classified'.
- B. GHS label elements, including precautionary statements**
- Signal word** : No signal word.
- Hazard statements** : No known significant effects or critical hazards.
- Precautionary statements**
- Prevention** : Not applicable.
- Response** : Not applicable.
- Storage** : Not applicable.
- Disposal** : Not applicable.
- C. Other hazards which do not result in classification**
- ☑ May form explosible dust-air mixture if dispersed.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	Common name	CAS number	%
Aluminium powder (stabilized)	aluminium	7429-90-5	≥75 - ≤90
silicon	silicon	7440-21-3	≥10 - ≤25

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.

Section 4. First aid measures

- A. Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
- B. Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
- C. Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
- D. Ingestion** : Wash out mouth with water. 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. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.
- E. Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

- A. Extinguishing media**
- Suitable extinguishing media** : Use approved Class D extinguisher or smother with dry sand, dry clay or dry ground limestone. Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : CO₂, water, ABC powder and foam.
- B. Specific hazards arising from the chemical** : May form explosible dust-air mixture if dispersed.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
metal oxide/oxides
- C. Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special precautions for fire-fighters** : 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.
- Remark (Explosibility)** : May form explosible dust-air mixture if dispersed.
- Kst Value: 103 bar m/s - Class ST1
Minimum ignition energy (mJ): 1000 to 10000

Section 6. Accidental release measures

- A. Personal precautions, protective equipment and emergency procedures** : 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. Put on appropriate personal protective equipment.
- B. Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Section 6. Accidental release measures

C. Methods and materials for containment and cleaning up

- Small spill** : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Avoid dust generation. Do not dry sweep. Use only vacuum cleaners equipped with a wet separator system and a grounding cable (ATEX, Hazardous locations certified / Suitable for use with Group E (IIIC) Conductive Dusts / Suitable for use in Class 2, Division II (Zone 22) locations or better). Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Use only vacuum cleaners equipped with a wet separator system and a grounding cable (ATEX, Hazardous locations certified / Suitable for use with Group E (IIIC) Conductive Dusts / Suitable for use in Class 2, Division II (Zone 22) locations or better). Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

A. Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Avoid breathing dust.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- B. Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. 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. 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 containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

A. Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Aluminium powder (stabilized)	Ministry of Employment and Labor (Republic of Korea, 1/2020). TWA: 10 mg/m ³ 8 hours. Form: Dust
silicon	Ministry of Employment and Labor (Republic of Korea, 1/2020). TWA: 10 mg/m ³ 8 hours.

- B. Appropriate engineering controls** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Environmental exposure controls** : 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 8. Exposure controls/personal protection

C. Personal protective equipment

- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.
- Eye protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields. If operating conditions cause high dust concentrations to be produced, use dust goggles.
- 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.
- Body protection** : 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.
For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Hygiene measures** : Do not blow dust off clothing or skin with compressed air. 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. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 9. Physical and chemical properties

A. Appearance

- Physical state** : Solid. [Powder. particle size: 100% <100 µm]
- Color** : Silver. Gray.
- B. Odor** : Odorless.
- C. Odor threshold** : Not applicable.
- D. pH** : Not applicable.
- E. Melting/freezing point** : 570 to 660°C (1058 to 1220°F)
- F. Boiling point/boiling range** : Not available.
- G. Flash point** : Not available.
- Fire point** : Not available.
- H. Evaporation rate** : Not available.
- I. Flammability (solid, gas)** : Flammable.
- J. Lower and upper explosive (flammable) limits** : Lower: 30 g/m³ (minimum explosive concentration of dust)
- Explosive properties** : May form explosive dust-air mixture if dispersed.

Kst Value: 103 bar m/s - Class ST1
Minimum ignition energy (mJ): 1000 to 10000
- K. Vapor pressure** : Not available.
- L. Solubility** : Not available.
- Solubility in water** : Insoluble.

Section 9. Physical and chemical properties

- M. Vapor density** : Not available.
- N. Relative density** : Not available.
- Density** : 2.5 to 2.7 g/cm³ (Al alloy)
0.7 to 1.5 g/cm³ (Bulk density: Powder.)
- O. Partition coefficient: n-octanol/water** : Not applicable.
- P. Auto-ignition temperature** : Minimum cloud ignition temperature (°C): >600 (>1112°F)
Minimum layer ignition temperature (°C): >400 (>752°F)
- Q. Decomposition temperature** : Not applicable.
- R. Viscosity** : Not applicable.
- S. Molecular weight** : Not applicable.

Section 10. Stability and reactivity

- A. Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

Evolves hydrogen on contact with water. Keep away from the following materials to prevent strong exothermic reactions: Strong oxidizing materials. Fine dust clouds may form explosive mixtures with air.
- B. Conditions to avoid** : Keep away from water or moist air. Keep away from heat, sparks and flame. Avoid dust generation. Avoid static electrical charge.
- C. Incompatible materials** : Reactive or incompatible with the following materials: water, alcohols, amines, alkalis, acids, oxidizing materials, halogenated hydrocarbons, combustible materials.
- D. Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Contact with water liberates extremely flammable gases. Hydrogen source. [<1 L / (kg h)]

Section 11. Toxicological information

- A. Information on the likely routes of exposure** : Not available.

Potential acute health effects

- Inhalation** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.
- Ingestion** : No known significant effects or critical hazards.
- Skin contact** : No known significant effects or critical hazards.
- Eye contact** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

Over-exposure signs/symptoms

- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Ingestion** : No specific data.
- Skin contact** : No specific data.
- Eye contact** : Adverse symptoms may include the following:
irritation
redness

B. Health hazards

Section 11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure	Remarks
Aluminium powder (stabilized)	LC50 Inhalation Dusts and mists	Rat	>0.888 mg/l	4 hours	Mortality: None.
	LD50 Oral	Rat	>2000 mg/kg	-	Mortality: None.
	NOAEL Inhalation Dusts and mists	Rat	10 mg/m ³	4 hours	-

Conclusion/Summary : Based on available data, the classification criteria are not met.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitization

Conclusion/Summary : Not available.

CMR - ISHA Article 42 Occupational Exposure Limits

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP	ACGIH
Aluminium powder (stabilized)	-	-	-	A4

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Potential chronic health effects

Chronic toxicity

Not available.

Conclusion/Summary : Not available.

General : Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

A. Ecotoxicity

Conclusion/Summary : Not available.

B. Persistence and degradability

Conclusion/Summary : The methods for determining the biological degradability are not applicable to inorganic substances.

C. Bioaccumulative potential

Not available.

D. Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Mobility : Not available.

E. Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

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

B. Disposal precautions : This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	UN	IMDG	IATA
A. UN number	Not regulated.	Not regulated.	Not regulated.
B. UN proper shipping name	Not regulated.	Not regulated.	Not regulated.
C. Transport hazard class(es)	Not regulated.	Not regulated.	Not regulated.
Label			
D. Packing group	Not regulated.	Not regulated.	Not regulated.
E. Environmental hazards	No.	Marine Pollutant: No	No.

F. 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.

Section 14. Transport information

Transport in bulk according to IMO instruments : Not applicable.

Section 15. Regulatory information

A. Regulation according to ISHA

ISHA article 117 (Harmful substances prohibited from manufacture) : None of the components are listed.

ISHA article 118 (Harmful substances requiring permission) : None of the components are listed.

Article 2 of Youth Protection Act on Substances Hazardous to Youth : Not applicable.

Exposure Limits of Chemical Substances and Physical Factors

The following components have an OEL:

☑ Aluminium powder (stabilized)

silicon

ISHA Enforcement Regs Annex 19 (Exposure standards established for harmful factors) : ☑ The following components are listed: manganese and its inorganic compounds

ISHA Enforcement Regs Annex 21 (Harmful factors subject to Work Environment Measurement) : ☑ The following components are listed: aluminum and its compounds

ISHA Enforcement Regs Annex 22 (Harmful Factors Subject to Special Health Check-up) : ☑ The following components are listed: Aluminum and its compounds

Standard of Industrial Safety and Health Annex 12 (Hazardous substances subject to control) : The following components are listed: aluminum and its compounds

B. Regulation according to Chemicals Control Act

CCA Article 20 Toxic Chemicals (K-Reach Article 20) : Not applicable

CCA Article 18 Prohibited (K-Reach Article 27) : None of the components are listed.

CCA Article 20 Restricted (K-Reach Article 27) : None of the components are listed.

Existing Chemical Substances Subject to Registration : None of the components are listed.

CCA Article 11 (TRI) : The following components are listed: Aluminium and its compounds

Section 15. Regulatory information

- CCA Article 39 (Accident Precaution Chemicals)** : None of the components are listed.
- C. Dangerous Materials Safety Management Act** : **Class:** Class 2 - Combustible Solid
Item: 5. Metal powder
Threshold: 500 kg
Danger category: III
- D. Wastes regulation** : Dispose of contents and container in accordance with all local, regional, national and international regulations.
- E. Regulation according to other foreign laws**
- International regulations
- Chemical Weapon Convention List Schedules I, II & III Chemicals
Not listed.
- Montreal Protocol
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

- Australia** : All components are listed or exempted.
- Canada** : All components are listed or exempted.
- China** : All components are listed or exempted.
- Europe** : All components are listed or exempted.
- New Zealand** : All components are listed or exempted.
- Philippines** : All components are listed or exempted.
- Republic of Korea** : All components are listed or exempted.
- Taiwan** : All components are listed or exempted.
- Turkey** : All components are listed or exempted.
- United States** : ☑ All components are active or exempted.
- Viet Nam** : All components are listed or exempted.

Section 16. Other information

- A. References** : Not available.
- B. Date of issue/Date of revision** : 2021/04/16
- Date of previous issue** : 2020/02/18
- C. Version** : 2
- Date of printing** : 2021/04/16
- Other**
- ☑ Indicates information that has changed from previously issued version.

Section 16. Other information

Key to abbreviations	: 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) N/A = Not available SGG = Segregation Group UN = United Nations
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