

Product Aluminium Powder ALSi10Mg
 Revision Date 10/26/2016
 Revision 1



Safety Data Sheet (SDS)

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

Product Name	Aluminium Powder ALSi10Mg
Synonyms, Trade Names	Aluminium alloy powder.
Identified Uses	Metal powder for additive layer manufacture.
Supplier	Renishaw plc Brooms Road Stone Business Park Stone, Staffordshire ST15 0SH United Kingdom Tel: +44 (0) 1785 285000 (during UK office hours 09:00 to 17:00 UTC).
Contact Person	msds@renishaw.com
Emergency Telephone	999 / 911 or local emergency number.

SECTION 2: HAZARDS IDENTIFICATION

Appearance	Solid. Atomised powder/grit with irregular or spherical particles or needles.
Color	Grey.
Odor	Odourless.
Pictogram(s)	No pictogram required
Signal Word	No Signal Word
Hazard Statements	No hazard statements required.
Precautionary Statements	No precautionary statements required
Contains	Not applicable
GHS Classification	
Physical and Chemical Hazards	Not classified
Human Health	Not classified
Environment	Not classified
OSHA Regulatory Status	This product is Hazardous under the OSHA Hazard communication Standard.
Inhalation	Can cause irritation of the upper respiratory tract. Medical conditions aggravated by exposure: Asthma, chronic lung disease.
Ingestion	Can cause irritation of the gastrointestinal tract.
Skin Contact	Can cause mechanical irritation or allergic skin reaction.
Eye Contact	Dust can cause mechanical irritation.
Routes of Exposure	No information available.
Other Hazards	Dust clouds may be explosive. Powder or dusts in contact with water can generate flammable/explosive hydrogen gas. Dust can irritate the eyes. High dust levels may irritate the respiratory system.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Name	Product Identifier	GHS Classification	%
aluminium powder (stabilised)	CAS-No.: 7429-90-5 EC No.: 231-072-3	Flam. Sol 1- H228, Water-react 2 - H261	87-91%
silicon	CAS-No.: 7440-21-3 EC No.: 231-130-8		9-11%

Composition Comments

No additional information available.

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

General Information

Provide general first aid, rest, warmth and fresh air. As a general rule, in case of doubt or if symptoms persist, always call a doctor. Seek medical attention for all burns and eye injuries, regardless how minor they may seem. First aid personnel must be aware of own risk during rescue.

Inhalation

If inhaled, remove to fresh air. Check for clear airway, breathing, and presence of pulse. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation where pulse or respiration are absent. Get prompt medical attention. If breathing is difficult, provide oxygen.

Ingestion

DO NOT induce vomiting! Rinse mouth out and then drink plenty of water. Get medical attention if discomfort occurs. Never give anything by mouth to a person who is unconscious or is having convulsions. Get medical attention.

Skin Contact

Remove contaminated clothing, shoes and jewelry and wash before reuse. Wash skin with soap and water for several minutes. Get medical attention if irritation develops or persists.

Eye Contact

Do not rub eye. Avoid contaminating unaffected eye. Make sure to remove any contact lenses from the eyes. Rinse with a gentle stream of water or saline for at least 15 minutes. Hold eye lids open. Get prompt medical attention.

Most Important Symptoms and Effects, Both Acute and Delayed

General Information

The severity of the symptoms described will vary dependent on the concentration and the length of exposure.

Inhalation

Can cause irritation of the upper respiratory tract. Medical conditions aggravated by exposure: Asthma, chronic lung disease.

Ingestion

Can cause irritation of the gastrointestinal tract.

Skin Contact

Can cause mechanical irritation or allergic skin reaction.

Eye Contact

Dust can cause mechanical irritation.

Routes of Exposure

No information available.

Most Important Symptoms and Effects, Both Acute and Delayed

Notes To The Physician

Treat symptomatically.

SECTION 5: FIRE-FIGHTING MEASURES

Auto Ignition Temperature (°C)

No information available.

Flammability Limit - Lower(%)

No information available.

Flammability Limit - Upper(%)

No information available.

Flash Point

No information available.

Extinguishing Media

Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand) to cover and ring the burning material. Use ONLY Class D – Dry Powder - extinguishers with spin applicators for smother effect application. DO NOT USE water, halogenated agents, or ABC dry chemical agents. These fire extinguishing agents will react with the burning material.

Hazardous Combustion Products

Decomposition of this product may yield metallic oxides.

Unusual Fire & Explosion Hazards

Dust clouds may be explosive. Dust accumulation on floor, ledges and beams can present a risk.

Contact of powder or dust with water may result in release of hydrogen gas.

Powder or dusts in contact with certain metal oxides (e.g. rust, copper oxide) may result in release of heat and flammable gas.

Special Fire Fighting Procedures

Gently smother burning material with dry sand or other inert substance, or special powder (Class D – Dry Powder) extinguishers with spin applicator. Gently cover and ring the burning

Protective Equipment for Firefighters	<p>material.</p> <p>Avoid mixing of the extinguishing agent with the burning material. Apply extinguishing media carefully to avoid creating airborne dust. Do not disturb the material until completely cool.</p> <p>If possible, fight fire from protected position. Keep up-wind to avoid fumes. Ventilate closed spaces before entering them. Avoid breathing fire vapours.</p> <p>Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to MSHA/NIOSH standards will provide a basic level of protection for chemical incidents. (See also NFPA 1971/NFPA 1851.)</p>
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SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions	<p>Wear protective clothing as described in Section 8 of this safety data sheet. Avoid inhalation of vapours and contact with skin and eyes. Provide adequate ventilation. In case of inadequate ventilation, use respiratory protection. Do not smoke, eat or drink while using this product. Eliminate all sources of ignition. Wash hands after use.</p> <p>Read and follow manufacturer's recommendations. Do not touch or walk through spilled material. If necessary evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering.</p>
For Emergency Responders	<p>Follow safe handling advice and personal protective equipment recommendations for normal use of product.</p>
Environmental Precautions	<p>Prevent from entering sewers or the immediate environment. In case of large spill, inform local police, local authority and/or fire brigade as appropriate.</p>
Spill Clean Up Methods	<p>Eliminate all ignition sources. Evacuate area. Use dry cleanup procedures. Collect any spilled material immediately by vacuuming or shoveling - use non sparking tools or equipment/natural bristle brushes.</p> <p>Seal containers for disposal (See Section 13). Do not flush with water or aqueous cleansing agents - Use dry cleanup procedures. If using vacuum suction equipment ensure that it is suitable for use with ignitable dusts.</p> <p>Take care not to raise dust. Place in labelled, dry, water-tight containers.</p> <p>Restrict non-essential personnel from the area. In case of spills, beware of slippery floors and surfaces.</p>

SECTION 7: HANDLING AND STORAGE

Handling	<p>Use personal protective equipment, see Section 8. Avoid generation of dust clouds/accumulation of dust in work area. Ensure good dust ventilation during handling. Formation of sparks and static electricity must be prevented. Earth all equipment. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations .</p> <p>Avoid contact with water.</p>
Usage Description Storage Precautions	<p>Use only according to directions.</p> <p>Keep locked up and out of reach of children. Avoid contact with incompatible materials, static, moisture, and flames. Storage rooms must be of fire-resistant construction. Store powder separately from other combustible materials.</p> <p>Keep containers tightly closed. Keep away from heat, sparks and open flame. Avoid contact with oxidising agents. Store in tightly closed original container in a cool, dry and well-ventilated place. Do not allow chips, fines or dust to contact water, particularly in enclosed areas.</p>
Specific End Use(s)	<p>The identified uses for this product are detailed in Section 1.</p>

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Equipment



Component	STD	TWA (8 Hrs)		STEL (15mins)		Notes
aluminium powder (stabilised)	WEL		10mg/m3			Inhalable.
aluminium powder (stabilised)	WEL		4mg/m3			Respirable.
aluminium powder (stabilised)	NIOSH		10mg/m3			Total dust.
aluminium powder (stabilised)	NIOSH		5mg/m3			Respirable fraction, pyro powders, welding fumes.
aluminium powder (stabilised)	NIOSH		2mg/m3			Soluble salts, alkyls.
silicon	WEL		10mg/m3			Inhalable.
silicon	WEL		4mg/m3			Respirable.
silicon	NIOSH		10mg/m3			Total dust.
silicon	NIOSH		5mg/m3			Respirable fraction.

Ingredient Comments	No information available.
Process Conditions	Ensure that eye flushing systems and safety showers are located close by in the work place.
Engineering Measures	Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Use with adequate explosion-proof ventilation designed to handle metal particulates.
Respiratory Equipment	A NIOSH approved dust mask or filtering facepiece is recommended in poorly ventilated areas or when permissible exposure limits may be exceeded. Respirators should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134). If the respirator is the sole means of protection, use a full-face supplied air respirator. Change filters frequently Use respiratory protection as specified by qualified professional if concentrations exceed the limits listed in Section 8.
Hand Protection	Use suitable protective gloves if there is a risk of skin contact. Suggested material: Nitrile rubber. Minimum layer thickness: 0.11 mm. Break through time: 480 min. Consult manufacturer for specific advice. Selection of the glove material depends on consideration of the penetration times, rates of diffusion and degradation, and concentration specific to the workplace. Where hand contact with the product may occur use gloves approved to relevant standards (e.g.US: F739). Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Change gloves regularly.
Eye Protection	Wear safety goggles or face shield to prevent any possibility of eye contact. Wear safety glasses with side shields (or goggles). Ensure compliance with OSHA's PPE standard (29 CFR 1910.132 and .133) for eye and face protection.
Hygiene Measures	Observe normal hygiene standards. Keep container tightly closed. Do not eat, drink, or smoke while using this product. Immediately take off any contaminated clothing and launder before re-use. Wash hands and / or face before breaks and at the end of the shift. After work, wash the skin and apply skin cream.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Appearance	Solid. Atomised powder/grit with irregular or spherical particles or needles.
Color	Grey.
Odor	Odourless.
Odor Threshold - Lower	No information available.
Odor Threshold - Upper	No information available.
pH-Value, Conc. Solution	No information available.
pH-Value, Diluted Solution	No information available.
Melting Point	660 °C
Initial Boiling Point and Boiling Range	2467 °C
Flash Point	No information available.
Evaporation Rate	No information available.

Flammability State	No information available.
Flammability Limit - Lower(%)	No information available.
Flammability Limit - Upper(%)	No information available.
Vapor Pressure	No information available.
Vapor Density (air=1)	No information available.
Relative Density	2.7g/cm ³ at 20 °C
Bulk Density	No information available.
Solubility	Insoluble in water and organic solvents.
Decomposition Temperature	No information available.
Partition Coefficient; n-Octanol/Water	No information available.
Auto Ignition Temperature (°C)	No information available.
Viscosity	No information available.
Explosive Properties	Fine aluminum powder may be explosive if dispersed into a dust cloud in air in the presence of a source of ignition. Will react exothermically if mixed with a strong oxidising substance and ignited. Minimum Ignition Energy (Electrostatic Spark): 500 - 1000 mJ. Minimum Ignition Energy (Mechanical Spark): 30 – 40 mJ. Minimum Ignition Temperature: >1000°C. Layer Ignition Temperature: >400°C. Minimum Explosive Concentration: 70g/m ³ . Limiting Oxygen for Combustion: 10%. Pmax: 6.4 bar. Kmax: 46 bar.m.s ⁻¹ . St Class: 1. 1832 °F.
Oxidizing Properties	No information available.
Molecular Weight	No information available.
Volatile Organic Compound	No information available.
Other Information	* Data is indicative and will vary depending on chemistry and particle size distribution. These are typical values and do not constitute a specification. Limiting Oxygen Concentration* (% by volume): 10.

SECTION 10: STABILITY AND REACTIVITY

Reactivity	Will react exothermically if mixed with a strong oxidising substance and ignited. Stable product under recommended storage and handling conditions.
Polymerization Description	Not applicable.
Stability	Stable product under recommended storage and handling conditions.
Hazardous Polymerization	Will not polymerise.
Hazardous Decomposition Products	Thermal decomposition or combustion may liberate hazardous/flammable gasses.
Conditions to Avoid	High temperatures, humid conditions, contact with water, contact with oxidising substances, and sources of ignition.
Materials to Avoid	Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g. ammonium nitrate and nitrate fertilizers) when heated or molten. Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided or molten aluminium. Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite

reaction generating considerable heat can occur.
 Reaction with aluminium fines and dusts requires only very weak ignition sources for initiation. Iron powder and water: Explosive reaction forming hydrogen gas when heated above 800°C.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological Information	Silicon dust seems to have little adverse effect on lungs and does not appear to produce significant organic disease or toxic effects when exposures are kept under reasonable control. Chronic overexposure may cause respiratory illness. Inhalation of metal fumes may cause metal fume fever.
Acute Toxicity (Oral LD50)	Silicon (7440-21-3) Oral LD50 Rat: 3160 mg/kg.
Acute Toxicity (Dermal LD50)	No information available.
Acute Toxicity (Inhalation LC50)	No information available.
Skin Corrosion/Irritation	No information available.
Respiratory Sensitization	No information available.
Skin Sensitization	No information available.
Reproductive Toxicity:	No information available.
Germ Cell Mutagenicity	No information available.
Carcinogenicity:	
Carcinogenicity	No carcinogenicity data available for this product.
NTP - Carcinogenicity	The product and its components are not listed.
OSHA - Carcinogenicity	The product and its components are not listed.
IARC Carcinogenicity	The product and its components are not listed.
Specific Target Organ Toxicity - Single Exposure:	
STOT - Single Exposure	No information available.
Specific Target Organ Toxicity - Repeated Exposure:	
STOT - Repeated Exposure	No information available.

SECTION 12: ECOLOGICAL INFORMATION

Acute Toxicity - Fish	No information available.
Acute Toxicity - Aquatic Invertebrates	No information available.
Acute Toxicity - Aquatic Plants	No information available.
Acute Toxicity - Microorganisms	No information available.
Chronic Toxicity - Fish	No information available.
Chronic Toxicity - Aquatic Invertebrates	No information available.
Chronic Toxicity - Aquatic Plants	No information available.
Chronic Toxicity - Microorganisms	No information available.
Ecotoxicity	No Ecological information on the finished product.
Eco Toxicological Information	No ecological toxicity available on the overall finished product.
Degradability	Will convert to aluminum oxide (alumina) during prolonged contact with water. The product is not biodegradable.
Bioaccumulative Potential	Will not bio-accumulate.
Mobility	No information available.
Results of PBT and vPvB Assessment	No information available.
Other Adverse Effects	Water reactive.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Management	When handling waste, consideration should be made to the safety precautions applying to handling of the product. Waste product should be disposed of via a licensed operator or may be sent to a metals reclamation facility that is able to handle fines.
Disposal Methods	Dispose of all waste in accordance with local, state, and federal regulations covering solid

waste disposal.

SECTION 14: TRANSPORT INFORMATION

UN Number

UN No. (DOT/TDG)	Not applicable.
UN No. (IMDG)	Not applicable.
UN No. (IATA)	Not applicable.

Proper Shipping Name

DOT/TDG Proper Shipping Name	Not applicable.
IMDG Proper Shipping Name	Not applicable.
IATA Proper Shipping Name	Not applicable.

Transport Hazard Class(es)

DOT/TDG Class	Not applicable.
IMDG Class	Not applicable.
IATA Class	Not applicable.

Transport Labels	Not applicable
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Packing Group(s)

DOT Packing Group	Not applicable.
IMDG Packing Group	Not applicable.
IATA Packing Group	Not applicable.

Special Precautions for User

EMS	Not applicable.
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Environmentally Hazardous Substance/Marine Pollutant

ADR	No
IMDG	No
IATA	No

SECTION 15: REGULATORY INFORMATION

Approved Code of Practice	Workplace Exposure Limits Guidance Note EH40/2005.
	GHS Classification in accordance with 29 CFR 1910 (OSHA HCS).

US Federal Regulations

SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities	
The Following Ingredients are Listed	None Listed.

CERCLA/Superfund, Hazardous Substances/Reportable Quantities (EPA)	
The Following Ingredients are Listed	None Listed.

SARA Extremely Hazardous Substances EPCRA Reportable Quantities	
The Following Ingredients are Listed	None Listed.

SARA 313 Emission Reporting	
The Following Ingredients are Listed	aluminium powder (stabilised)

CAA Accidental Release Prevention	
The Following Ingredients are Listed	None Listed.

OSHA Highly Hazardous Chemicals	
The Following Ingredients are Listed	None Listed.

US State Regulations

California Proposition 65 Carcinogens and Reproductive Toxins
The Following Ingredients are Listed None Listed.

California Air Toxics "Hot Spots" (A-I)
The Following Ingredients are Listed None Listed.

California Air Toxics "Hot Spots" (A-II)
The Following Ingredients are Listed None Listed.

Massachusetts "Right To Know" List
The Following Ingredients are Listed aluminium powder (stabilised)
silicon

Rhode Island "Right To Know" List
The Following Ingredients are Listed aluminium powder (stabilised)
silicon

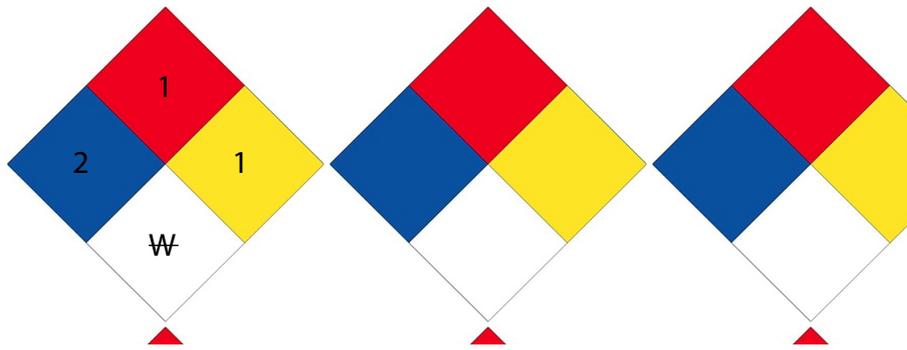
Minnesota "Right To Know" List
The Following Ingredients are Listed aluminium powder (stabilised)
silicon

New Jersey "Right To Know" List
The Following Ingredients are Listed silicon

Pennsylvania "Right To Know" List
The Following Ingredients are Listed aluminium powder (stabilised)

SECTION 16: OTHER INFORMATION

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)



HAZARDOUS MATERIAL INFORMATION SYSTEM (HMIS)

Health	2
Flammability	1
Physical Hazard	1
Personal Protection	E

General Information	No information available.
Revision Comments	This is a first issue.
Revision Date	10/26/2016
Revision	1

Disclaimer

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