

Product Aluminium Powder ALSi10Mg
 Revision date 31 July 2018
 Revision 2



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 not 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 of 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	60-100%
silicon	CAS-No.: 7440-21-3 EC No.: 231-130-8		10-30%
manganese	CAS-No.: 7439-96-5 EC No.: 231-105-1		0.001-0.01%

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. If breathing is difficult, provide oxygen. Provide cardiopulmonary resuscitation where pulse or respiration are absent. Get prompt medical attention.
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.
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.
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 material. 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. If possible, fight fire from protected position. Keep up-wind to avoid fumes. Ventilate closed

spaces before entering them. Avoid breathing fire vapours.

Protective equipment for firefighters 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.)

Section 6: Accidental release measures

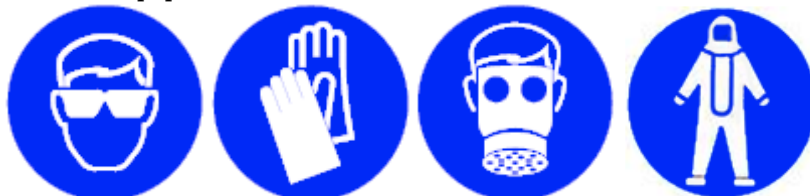
Personal precautions	Wear protective clothing as described in Section 8 of this safety data sheet. Avoid inhalation of vapours and contact with skin and eyes. Provide adequate ventilation. In case of inadequate ventilation, use respiratory protection. Eliminate all sources of ignition. Read and follow manufacturer's recommendations. Do not touch or walk through spilled material. If necessary evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering.
For emergency responders	Follow safe handling advice and personal protective equipment recommendations for normal use of product.
Environmental precautions	Prevent from entering sewers or the immediate environment. In case of large spill, inform local police, local authority and/or fire brigade as appropriate.
Spill clean up methods	Eliminate all ignition sources. Evacuate area. Collect any spilled material immediately by vacuuming or shoveling - use non sparking tools or equipment/natural bristle brushes. 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. Take care not to raise dust. Place in labelled, dry, water-tight containers.

Section 7: Handling and storage

Handling	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. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations . Avoid contact with water.
Usage description Storage precautions	Use only according to directions. Store in tightly closed original container in a dry, cool and well-ventilated place. Keep away from incompatible materials (see section 10). Storage rooms must be of fire-resistant construction. Store powder separately from other combustible materials. Keep away from heat, sparks and open flame. Do not allow chips, fines or dust to contact water, particularly in enclosed areas. Avoid contact with incompatible materials, static, moisture, and flames. The area should be suitably marked to indicate the presence of an ignitable dust. No smoking - warning should be present.
Specific end use(s)	The identified uses for this product are detailed in Section 1.

Section 8: Exposure controls/Personal protection

Protective equipment



Component	STD	TWA (8 Hrs)	STEL (15mins)	Notes
Aluminium powder (stabilised)	NIOSH	10 (1) mg/m ³		Aluminium metal, (1) total dust.
Aluminium powder (stabilised)	NIOSH	5 (2) mg/m ³		Aluminium metal, (2) respirable fraction, pyro powders, welding fumes.
Aluminium powder (stabilised)	NIOSH	2 (3) mg/m ³		Aluminium metal, (3) soluble salts, alkyls.
Aluminium powder (stabilised)	WEL	10 inhalable aerosol mg/m ³		
Aluminium powder (stabilised)	WEL	4 respirable aerosol mg/m ³		
silicon	NIOSH	10 total dust mg/m ³		
silicon	NIOSH	5 respirable fraction mg/m ³		
silicon	WEL	10 inhalable aerosol mg/m ³		
silicon	WEL	4 respirable aerosol mg/m ³		
manganese	NIOSH	1 mg/m ³	3 (1) mg/m ³	Manganese and inorganic compounds, (1) 15 minutes average value.
manganese	NIOSH	1 mg/m ³	3 (1) mg/m ³	Manganese, fume or respirable dust, (1) 15 minutes average value.
manganese	WEL	0,5 mg/m ³		Manganese and inorganic compounds.
manganese	WEL	[0,5] mg/m ³		Manganese, fume or respirable dust.

Ingredient comments

Workplace Exposure Limit (WEL).
The National Institute for Occupational Safety and Health (NIOSH).

**Process conditions
Engineering measures**

Ensure that eye flushing systems and safety showers are located close by in the work place. 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

Suggested PPE: Dust/aerosol mask with filter type P3. If the respirator is the sole means of protection, use a full-face supplied air respirator. Change filters frequently
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).

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. F739, 29CFR1910.138).

Eye protection

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.

Hygiene measures

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.
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	1220°F.
Initial boiling point and boiling range	4472.6°F.
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	2.7 g/cm ³ at 68°F.
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	<p>Fine aluminum powder may be explosive if dispersed into a dust cloud in air in the presence of a source of ignition.</p> <p>Will react exothermically if mixed with a strong oxidising substance and ignited.</p> <p>Minimum Ignition Energy (Electrostatic Spark): 500 - 1000 mJ.</p> <p>Minimum Ignition Energy (Mechanical Spark): 30 - 40 mJ.</p> <p>Minimum Ignition Temperature: 1832 °F.</p> <p>Layer Ignition Temperature: 725°F.</p> <p>Minimum Explosive Concentration: 70g/m³.</p> <p>Limiting Oxygen for Combustion: 10%.</p> <p>Pmax: 6.4 bar.</p> <p>Kmax: 46 bar.m.s-1.</p> <p>St Class: 1.</p>
Oxidizing properties	No information available.
Molecular weight	No information available.
Volatile organic compound	No information available.
Other information	<p>* 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.</p>

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	Store separately from acids, alkalies, and oxidising agents. Water, moisture. Rust and other contaminants.

Section 11: Toxicological information

Toxicological information	No toxicological information for the overall finished product.
Acute toxicity (Oral LD50)	No information available.
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 information available.
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	Not classified as dangerous for the environment according to the criteria of Regulation (EC) No 1272/2008.
Degradability	Will convert to aluminum oxide (alumina) during prolonged contact with water.
Bioaccumulative potential	No data available on bioaccumulation.
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. Contaminated packaging should be disposed of according to local authority guidelines.
Disposal methods	Dispose in accordance with all applicable federal, state and local laws and regulations.

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

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.
------------	-----------------

Environmentally hazardous substance/Marine pollutant

ADR	No
IMDG	No
IATA	No

Additional information

Additional information	These powders-atomised when tested in accordance with procedures in the U.N. Transport of Dangerous Goods recommendations do not meet the criteria for Classes 4.1 or 4.3. The Laboratory of the Government Chemist (UK) has confirmed that these aluminum grit/powders are 'Non Hazardous' for International Transport by Sea, 'not restricted' for International Transport by Air, and not subject to the provisions of ADR (European Road).
-------------------------------	--

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 Aluminium powder (stabilised)
manganese

SARA 313 emission reporting

The following ingredients are listed Aluminium powder (stabilised)
manganese

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 Aluminium powder (stabilised)
manganese

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
manganese

Rhode Island "Right To Know" list

The following ingredients are listed Aluminium powder (stabilised)
silicon
manganese

Minnesota "Right To Know" list

The following ingredients are listed Aluminium powder (stabilised)
silicon
manganese

New Jersey "Right To Know" list

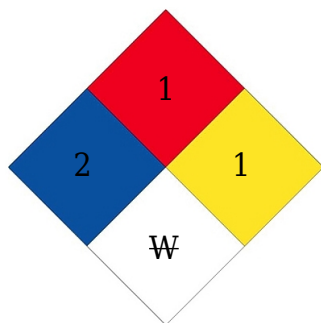
The following ingredients are listed Aluminium powder (stabilised)
manganese

Pennsylvania "Right To Know" list

The following ingredients are listed Aluminium powder (stabilised)
silicon
manganese

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
Revision comments

This Safety Data Sheet is in accordance with Reach Regulation (EC) No 453/2010. [2]Information updated. [3]Information updated. [5]Information updated. [6]Information updated. [7]Information updated. [8]Information updated. [9]Information updated. [10]Information updated. [12]Information updated. [14]Information updated. [4]Information updated. This is a second issue.

Revision date
Supersedes Date
Revision

31 July 2018
05 August 2016
2

Disclaimer

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.