

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

1.1 Product identifier

Product name Aluminium powder ALSi10Mg
Synonyms, Trade names Aluminium alloy powder.

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses Metal powder for additive layer manufacture.
Uses advised against Any other purpose.

1.3 Details of the supplier of the safety data sheet

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).
 msds@renishaw.com

Contact person

1.4 Emergency telephone number

Emergency telephone 999 / 911 or local emergency number

Section 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (EC 1272/2008)
 Physical and chemical hazards Not classified
 Human health Not classified
 Environment Not classified

2.2 Label elements

Contains Not applicable

Label in accordance with (EC) no. 1272/2008 No pictogram required

Signal word No Signal Word

Hazard statements No hazard statements required

Precautionary statements **Prevention**
 P260 Do not breathe dust/fume/ gas/mist/vapours/spray.
 P262 Do not get in eyes, on skin or on clothing.
 P280 Wear protective gloves/ protective clothing/eye protection/face protection.

2.3 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/identification of ingredients**3.1 Substance**

Not applicable.

3.2 Mixtures

Name	Product identifier	Reg. EU 1272/2008	%
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%

The full text for all hazard statements are displayed in section 16.

Composition comments

The data shown are in accordance with the latest EC Directives.

Section 4: First aid measures**4.1 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. 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.

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.

4.2 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.

4.3 Indication of any immediate medical attention and special treatment needed**Notes to the physician**

Treat symptomatically.

Section 5: Fire-fighting measures**5.1 Extinguishing media****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.

Unsuitable extinguishing media

Water, Carbon dioxide, Foam, ABC Powder. Please note: Halogenated fire extinguishing agents can react violently with finely divided/powdered or molten aluminium.

5.2 Special hazards arising from the substance or mixture**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.
Specific hazards	Contact with water releases flammable gases (hydrogen).

5.3 Advice for firefighters

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 European standard EN 469 will provide a basic level of protection for chemical incidents.

Section 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

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.

6.2 Environmental precautions

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

6.3 Methods and material for containment and cleaning up

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

6.4 Reference to other sections

Reference to other sections	See section 1 for emergency contact. For personal protection, see section 8. For waste disposal, see section 13.
------------------------------------	------------------------------------------------------------------------------------------------------------------

Section 7: Handling and storage

7.1 Precautions for safe handling

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

7.2 Conditions for safe storage, including any incompatibilities

Storage precautions	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.
Flammable solid storage.

Storage class

7.3 Specific end use(s)

Specific end use(s)
Usage description

The identified uses for this product are detailed in Section 1.
Use only according to directions.

Section 8: Exposure controls/Personal protection

8.1 Control parameters

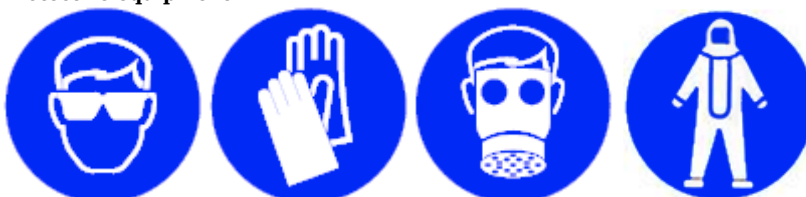
Component	STD	TWA (8 Hrs)	STEL (15mins)	Notes
Aluminium powder (stabilised)	NIOSH	10 (1) mg/m ³		Aluminium metal, (1) total dust.
Aluminium powder (stabilised)	NIOSH	5 (2) mg/m ³		Aluminium metal, (2) respirable fraction, pyro powders, welding fumes.
Aluminium powder (stabilised)	NIOSH	2 (3) mg/m ³		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).

8.2 Exposure Controls

Protective equipment



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	Suggested PPE: Dust mask with filter type P3 (EN 149). Where risk assessment shows air-purifying respirators are appropriate a full face respirator conforming to EN 143, (Type P 3), should be used, and suitable respirator cartridges as a backup to engineering controls. 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 the use of gloves approved to relevant standards (e.g. Europe: EN374) is recommended. 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. Use equipment for eye protection tested and approved under appropriate government standards such as EN 166(EU).
Other protection	Wear appropriate clothing to prevent any possibility of skin contact. Suggested PPE: Fire resistant cotton or equivalent full-length overalls with electrically conductive safety shoes or grounding straps. Caution is required to avoid contact with unprotected electrical devices when wearing conductive safety shoes or grounding straps. Protective clothing should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
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.
Process conditions	Ensure that eye flushing systems and safety showers are located close by in the work place.

Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	Solid. Atomised powder/grit with irregular or spherical particles or needles.
Colour	Grey
Odour	Odourless.
Odour threshold - lower	No information available.
Odour 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.
Vapour pressure	No information available.
Vapour density (air=1)	No information available.

Relative density	2.7 g/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)	Minimum Ignition Temperature* (MIT) >1000°C
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.
Oxidising properties	Will react exothermically if mixed with a strong oxidising substance and ignited.

9.2 Other information

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

10.1 Reactivity

Reactivity	Will react exothermically if mixed with a strong oxidising substance and ignited. Stable product under recommended storage and handling conditions.
-------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------

10.2 Chemical stability

Stability	Stable product under recommended storage and handling conditions.
------------------	-------------------------------------------------------------------

10.3 Possibility of hazardous reactions

Hazardous reactions	Will react exothermically if mixed with a strong oxidising substance and ignited. Contact with water releases flammable gases (hydrogen).
Hazardous polymerisation	Will not polymerise.
Polymerisation description	Not applicable.

10.4 Conditions to Avoid

Conditions to avoid	High temperatures, humid conditions, contact with water, contact with oxidising substances, and sources of ignition.
----------------------------	----------------------------------------------------------------------------------------------------------------------

10.5 Incompatible materials

Materials to avoid	Store separately from acids, alkalies, and oxidising agents. Water, moisture. Rust and other contaminants.
---------------------------	------------------------------------------------------------------------------------------------------------

10.6 Hazardous decomposition products

Hazardous decomposition products Thermal decomposition or combustion may liberate hazardous/flammable gasses.

Section 11: Toxicological information

11.1 Information on toxicological effects

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 LD50)	No information available.
Serious eye damage/irritation	Dust can cause mechanical irritation.
Skin corrosion/irritation	No information available.
Respiratory sensitisation	No information available.
Skin sensitisation	No information available.
Germ cell mutagenicity	No information available.
Carcinogenicity	No information available.
Specific target organ toxicity - Single exposure:	
STOT - Single exposure	No information available.
Specific target organ toxicity - Repeated exposure:	
STOT - Repeated exposure	No information available.
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.
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.
Routes of entry	No information available.
Target organs	Skin. Respiratory system, lungs.
Aspiration hazards:	No information available.
Reproductive toxicity:	No information available.

Section 12: Ecological information

12.1 Toxicity

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.

12.2 Persistence and degradability

Degradability	Will convert to aluminum oxide (alumina) during prolonged contact with water.
Biological oxygen demand	No information available.

Chemical oxygen demand No information available.

12.3 Bioaccumulative potential

Bioaccumulative potential No data available on bioaccumulation.
Bioaccumulation factor No information available.
Partition coefficient; n-Octanol/Water No information available.

12.4 Mobility in soil

Mobility No information available.

12.5 Results of PBT and vPvB assessment

Results of PBT and vPvB assessment No information available.

12.6 Other adverse effects

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.

13.1 Waste treatment methods

Disposal methods Dispose of waste and residues in accordance with local authority requirements, and in accordance with all local, national and international regulations.

Section 14: Transport information

14.1 UN number

UN no. (ADR) Not applicable.
UN no. (IMDG) Not applicable.
UN no. (IATA) Not applicable.

14.2 UN proper shipping name

ADR proper shipping name Not applicable.
IMDG proper shipping name Not applicable.
IATA proper shipping name Not applicable.

14.3 Transport hazard class(es)

ADR class Not applicable.
IMDG class Not applicable.
IATA class Not applicable.

Transport labels Not applicable

14.4 Packing group

ADR/RID/ADN packing group Not applicable.
IMDG packing group Not applicable.
IATA packing group Not applicable.

14.5 Environmental hazards

ADR No
IMDG No
IATA No

14.6 Special precautions for user

EMS	Not applicable.
Emergency action code	Not applicable.
Hazard no. (ADR)	Not applicable.
Tunnel restriction code	Not applicable.

14.7 Transport in bulk according to annex II of MARPOL73/78 and the IBC code

Not applicable.

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

15.1 Safety, health and environmental regulations/Legislation specific for the substance or mixture

EU legislation	Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 with amendments. The UN Globally Harmonized System (GHS) Safety Data Sheet format (Annex IV) is implemented as Annex II of REACH EU No 453/2010 of 20th May 2010 amending regulation (EC) No 1907/2006.
Approved code of practice	Workplace Exposure Limits Guidance Note EH40/2005.
Chemical safety assessment	No chemical safety assessment has been carried out. Water hazard Class: 1

Section 16: Other information

General information	This Safety Data Sheet is in accordance with Reach Regulation (EC) No 453/2010.
Revision comments	This is a first issue. [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.
Revision date	31 July 2018
Supersedes date	02 September 2016
Revision	2
Safety data sheet status	Approved.

Hazard statements in full

H228	Flammable solid.
H261	In contact with water releases flammable gases.

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.