

SAFETY DATA SHEETS

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

Creation Date: Aug 16, 2017

Revision Date: Aug 16, 2017

1. Identification

1.1 GHS Product identifier

Product name aluminium atom

1.2 Other means of identification

Product number -

Other names aluminium Powder

1.3 Recommended use of the chemical and restrictions on use

Identified uses For industry use only. Food additives

Uses advised against no data available

2. Hazard identification

2.1 Classification of the substance or mixture

no data available

2.2 GHS label elements, including precautionary statements

Pictogram(s) no data available

Signal word no data available

Hazard statement(s) no data available

Precautionary
statement(s)

Prevention no data available

Response	no data available
Storage	no data available
Disposal	no data available

2.3 Other hazards which do not result in classification

no data available

3. Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
aluminium atom	aluminium atom	7429-90-5	none	100%

4. First-aid measures

4.1 Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest.

In case of skin contact

Rinse skin with plenty of water or shower.

In case of eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

If swallowed

Rinse mouth.

4.2 Most important symptoms/effects, acute and delayed

Excerpt from ERG Guide 170 [Metals (Powders, Dusts, Shavings, Borings,

Turnings, or Cuttings, etc.)]: Oxides from metallic fires are a severe health hazard. Inhalation or contact with substance or decomposition products may cause severe injury or death. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may cause pollution. (ERG, 2016)

Excerpt from ERG Guide 135 [Substances - Spontaneously Combustible]: Fire will produce irritating, corrosive and/or toxic gases. Inhalation of decomposition products may cause severe injury or death. Contact with substance may cause severe burns to skin and eyes. Runoff from fire control may cause pollution. (ERG, 2016)

Excerpt from ERG Guide 138 [Substances - Water-Reactive (Emitting Flammable Gases)]: Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death. May produce corrosive solutions on contact with water. Fire will produce irritating, corrosive and/or toxic gases. Runoff from fire control may cause pollution. (ERG, 2016)

Excerpt from ERG Guide 169 [Aluminum (Molten)]: Contact causes severe burns to skin and eyes. Fire may produce irritating and/or toxic gases. (ERG, 2016)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

Diagnosis: when history is unattainable, diagnosis depends on the demonstration of large amount of aluminum in vomitus, stomach contents or feces. /Aluminum compounds/

5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Large fires must be isolated and allowed to burn out, but small ones can be controlled by sand, talc, or sodium chloride.

5.2 Specific hazards arising from the chemical

Excerpt from ERG Guide 170 [Metals (Powders, Dusts, Shavings, Borings, Turnings, or Cuttings, etc.)]: May react violently or explosively on contact with water. Some are transported in flammable liquids. May be ignited by friction, heat, sparks or flames. Some of these materials will burn with intense heat. Dusts or fumes may form explosive mixtures in air. Containers may explode when heated. May re-ignite after fire is extinguished. (ERG, 2016)

Excerpt from ERG Guide 135 [Substances - Spontaneously Combustible]: Flammable/combustible material. May ignite on contact with moist air or moisture. May burn rapidly with flare-burning effect. Some react vigorously or explosively on contact with water. Some may decompose explosively when heated or involved in a fire. May re-ignite after fire is extinguished. Runoff may create fire or explosion hazard. Containers may explode when heated. (ERG, 2016)

Excerpt from ERG Guide 138 [Substances - Water-Reactive (Emitting Flammable Gases)]: Produce flammable gases on contact with water. May ignite on contact with water or moist air. Some react vigorously or explosively on contact with water. May be ignited by heat, sparks or flames. May re-ignite after fire is extinguished. Some are transported in highly flammable liquids. Runoff may create fire or explosion hazard. (ERG, 2016)

Excerpt from ERG Guide 169 [Aluminum (Molten)]: Substance is transported in molten form at a temperature above 705°C (704.44°C). Violent reaction with water; contact may cause an explosion or may produce a flammable gas. Will ignite combustible materials (wood, paper, oil, debris, etc.). Contact with nitrates or other oxidizers may cause an explosion. Contact with containers or other materials, including cold, wet or dirty tools, may cause an explosion. Contact with concrete will cause spalling and small pops. (ERG, 2016)

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Sweep spilled substance into covered dry containers.

6.3 Methods and materials for containment and cleaning up

Environmental considerations: Water spill: Use natural barriers or oil spill control booms to limit spill travel. Use natural deep water pockets, excavated lagoons, or sand bag barriers to trap material at bottom. Remove trapped material with suction hoses.

7. Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Separated from strong oxidants, strong bases, strong acids and water. See Chemical Dangers. Dry. Well closed. Store in cool, dry, well-ventilated location. Separate from acids, alkalies, halogenated compounds, oxidizers, combustible materials.

8. Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

Recommended Exposure Limit: 10-Hr Time-Weighted Avg: 10 mg/cu m (total).
/Aluminum/

Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 5 mg/cu m (resp).
/Aluminum/

Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 2 mg/cu m.
/Aluminum (soluble salts and alkyls, as Al)/

Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 5 mg/cu m.
/Aluminum (pyro powders and welding fumes, as Al)/

Biological limit values

no data available

8.2 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. 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. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

Wear dust mask when handling large quantities.

Thermal hazards

no data available

9. Physical and chemical properties

Physical state	silver
Colour	Tin-white, malleable, ductile metal, with somewhat bluish tint
Odour	Odorless
Melting point/ freezing point	660°C
Boiling point or initial boiling point and boiling range	2460°C(lit.)
Flammability	Combustible Solid, finely divided dust is easily ignited; may cause explosions.Flammable.
Lower and upper explosion limit / flammability limit	no data available

Flash point	645°C
Auto-ignition temperature	760°C
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	Insoluble (NIOSH, 2016)
Partition coefficient n-octanol/water (log value)	no data available
Vapour pressure	0 mm Hg (approx) (NIOSH, 2016)
Density and/or relative density	2.7g/mL at 25°C (lit.)
Relative vapour density	no data available
Particle characteristics	no data available

10. Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

In moist air, oxide film forms which protects metal from corrosion.

10.3 Possibility of hazardous reactions

...Finely divided aluminum dust is easily ignited... Dust explosion possible if in powder or granular form, mixed with air. ALUMINUM POWDER, [COATED] is a reducing agent. Coating moderates or greatly moderates its reactivity compared to the uncoated material. Reacts exothermically if mixed with metal oxides and heated (thermite process). Heating a mixture with copper oxides caused a strong explosion [Mellor 5:217-19 1946-47]. Reacts with metal salts, mercury and mercury compounds, nitrates, sulfates, halogens, and halogenated hydrocarbons to form compounds that are sensitive to mechanical shock [Handling Chemicals Safely, 1980 p. 135]. A mixture with powdered ammonium persulfate and water may explode [NFPA 491M, 1991]. Heating a mixture with bismuth trioxide leads to an explosively violent reaction [Mellor 9:649, 1946-47]. Mixtures with finely divided bromates (also chlorates and iodates) of barium, calcium, magnesium, potassium, sodium or zinc can explode by heat, percussion, and friction, [Mellor 2:310, 1946-47]. Burns in the vapor of carbon

disulfide, sulfur dioxide, sulfur dichloride, nitrous oxide, nitric oxide, or nitrogen peroxide [Mellor 5:209-212, 1946-47]. A mixture with carbon tetrachloride exploded when heated to 153° C and also by impact [Chem. Eng. News 32:258, 1954; UL Bull. Research 34, 1945; ASESB Pot. Incid. 39, 1968]. Mixing with chlorine trifluoride in the presence of carbon results in a violent reaction [Mellor 2 Supp. 1, 1956]. Ignites in close contact with iodine. Three industrial explosions involving a photoflash composition containing potassium perchlorate with aluminum and magnesium powder have occurred [ACS 146:210, 1945; NFPA 491M 1991]. Reacts with methyl chloride in the presence of small amounts of aluminum chloride to give flammable trimethylaluminum. Gives a detonable mixture with liquid oxygen [NFPA 491M 1991]. The reaction with silver chloride, once started, proceeds with explosive violence [Mellor 3:402 1946-47]. In an industrial accident, the accidental addition of water to a solid mixture of sodium hydrosulfite and powdered aluminum caused the generation of SO₂, heat and more water. The aluminum powder reacted with water and other materials to generate more heat, leading to a deflagration that killed five workers [Case Study, Accident Investigation: Napp Technologies, 14th International Hazardous Material Spills Conference].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

A mixture of aluminum powder and ammonium nitrate can be used as an explosive. A number of explosions in which ammonium nitrate and aluminum are mixed with carbon, hydrocarbons, with or without oxidizing agents, have occurred.

10.6 Hazardous decomposition products

no data available

11. Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: no data available
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

A4: Not classifiable as a human carcinogen. /Aluminum metal and insoluble compounds/

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12. Ecological information

12.1 Toxicity

- Toxicity to fish: LC50 *Salmo trutta* (Brown trout, alevins) 19 ug/L/28 days; field study in upland Welsh streams /Conditions of bioassay not specified in source examined/ /Total monomeric aluminum
- Toxicity to daphnia and other aquatic invertebrates: LC50 *Daphnia magna* (Water flea) 9.5 mg/L/6 hr /Conditions of bioassay not specified in source examined/ /formulated product
- Toxicity to algae: no data available

- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Other adverse effects

no data available

13. Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

14. Transport information

14.1 UN Number

ADR/RID: UN3077

IMDG: UN3077

IATA: UN3077

14.2 UN Proper Shipping Name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

IATA: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

14.3 Transport hazard class(es)

ADR/RID: 9

IMDG: 9

IATA: 9

14.4 Packing group, if applicable

ADR/RID: III

IMDG: III

IATA: III

14.5 Environmental hazards

ADR/RID: no

IMDG: no

IATA: no

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

no data available

15. Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
aluminium atom	aluminium atom	7429-90-5	none
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.

16. Other information

Information on revision

Creation Date Aug 16, 2017

Revision Date Aug 16, 2017

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website:
<http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website:
<https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website:
<http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website:
http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website:
<http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website:
<http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website:

<http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>

- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. We as supplier shall not be held liable for any damage resulting from handling or from contact with the above product.