



MATERIAL SAFETY DATA SHEET
COMPLIES WITH 29 CFR 1910.1200.
OSHA HAZARD COMMUNICATION RULE

DATE OF LAST REVISION: 06-21-96

CHEMICAL IDENTITY

LABEL IDENTITY	Aluminum + 1% Silicon	
FORMULA	Al+1%Si	
CHEMICAL FAMILY	METAL	
CAS REGISTRY NUMBER	Al = 7429-90-5 Si = 7440-21-3	
HAZARDOUS INGREDIENTS	Aluminum Silicon	
EXPOSURE LIMITS		
Aluminum	99%	10mg/m3 ACGIH TWA
Silicon	1%	Nuisance particulates (nuisance dust): 5mg/m3 OSHA TWA (respirable dust); 15mg/m3 OSHA TWA (total dust); 10mg/m3 ACGIH TWA (total dust) (no asbestos and <1% crystalline silica)

PHYSICAL AND CHEMICAL PROPERTIES

COLOR, FORM AND ODOR	Silvery white, ductile metal with a bluish tint
BOILING POINT	4473°F (2467°C)
VAPOR PRESSURE @ 20°	1 MM @ 1540°C
% VOLATILE BY VOLUME (%)	ND
REACTION WITH WATER	ND
EVAPORATION RATE (H2O=1)	ND
SOLUBILITY IN WATER	Insoluble
SOLUBILITY	Soluble in hydrochloric acid, perchloric acid hot concentrated sulfuric acid, strong alkalis, Insoluble in concentrated nitric acid, hot acetic acid
MELTING POINT	1220°F (660°C)

FIRE AND EXPLOSION HAZARD DATA

FIRE AND EXPLOSION HAZARD	Negligible fire & explosion hazard in bulk metallic form. The moist finely divided metal ignite in air.
FIRE FIGHTING MEDIA	Dry chemical, carbon dioxide, water spray or regular foam. For larger fires use water spray, fog or regular foam.
FIRE FIGHTING	No acute hazard. Move container from fire area if possible. Avoid breathing vapors or dusts; keep upwind.



ALUMINUM + 1% SILICON MATERIAL SAFETY DATA SHEET

HEALTH HAZARD INFORMATION

TOXICITY DATA

ALUMINUM: **Carcinogen status: None**

Acute toxicity level: no data available

Target effects: No data available

SILICON: **25mg intratracheal-rabbit TDLO (85HEAA); Carcinogen status: None**

The toxicity of silicon has not been fully quantified. Dust may cause eye and respiratory irritation.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: **Pre-existing lung disorders**

EFFECTS OF OVEREXPOSURE (acute and chronic):

INHALATION:

Aluminum: (acute) **the only reported inhalation effects are for the dust, powder or fume forms.** (chronic) **no data available**

Silicon: (acute) **dust may cause respiratory and mucous membrane irritation. Intratracheal administration of 25mg in rabbits produced slight pulmonary lesions.** (chronic) **dust may cause mucous membrane irritation. Silicon dust seems to have little adverse effect on the lungs and does not appear to produce significant organic disease or toxic effects when exposures are kept under reasonable control and the total dust contains <1% quartz.**

SKIN CONTACT:

Aluminum: (acute) **a sliver of aluminum penetrating the skin may form aluminum salts which induce local irritation and possibly secondary infections. Contact with rough or sharp edges may cause cuts or abrasions.** (chronic) **no data available**

Silicon: (acute) **no data available, may cause irritation.** (chronic) **no data available.**

EYE CONTACT:

Aluminum: (acute) **small metal particles have been observed in the eyes of humans on or near the retina and are usually nonirritating and well tolerated. The particles gradually change into a white powder and disappear in 2 or 3 years leaving only a characteristic local necrotic "imprint". Larger particles and splinters may scratch or cut the cornea and lids.** (chronic) **no data available.**

Silicon: (acute) **silicon dust may cause irritation.** (chronic) **silicon dust may cause conjunctivitis after repeated or prolonged exposure.**

INGESTION:

Aluminum: (acute) **the actual effects may be determined by the form of the aluminum that is ingested. Generally it has a very low acute systemic toxicity due to its poor absorption from the gastrointestinal tract. Massive doses may cause gastrointestinal irritation and may be toxic.** (chronic) **large amounts may interfere with intestinal absorption of phosphates leading to rickets. Certain disease states influence the concentration of aluminum in organs, for example Alzheimer's disease in which excessive levels have been found in the brain.**

Silicon: (acute) **no effects have been reported from human exposure.** (chronic) **no effects have been reported from human exposure.**

Antidote: **no specific antidote, treat symptomatically and supportively.**



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HEALTH HAZARD INFORMATION CONTINUED

FIRST AID PROCEDURES:

INHALATION: remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep person warm and at rest. Treat symptomatically and supportively. Get medical attention immediately.

SKIN: remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (approximately 15-20 minutes). Get medical attention immediately.

EYE CONTACT: wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (approximately 15-20 minutes). Get medical attention immediately.

INGESTION: treat symptomatically and supportively. Get medical attention immediately. If vomiting occurs, keep head lower than hips to prevent aspiration.

REACTIVITY DATA

STABILITY: Stable under normal temperatures and pressures.

DECOMPOSITION: Thermal decomposition may release acid smoke and irritating fumes.

POLYMERIZATION: Has not been reported to occur under normal temperatures and pressures.

CONDITIONS TO AVOID: None reported.

INCOMPATIBILITIES:

ALUMINUM OTHER THAN POWDER:

- a) Arsenic trioxide, sodium arsenate and sodium hydroxide; the alkaline attack on the metal produced flammable hydrogen which in turn generated toxic arsine gas.
- b) Barium sulfate; violent explosion.
- c) Bromates (barium, calcium, magnesium, potassium, sodium or zinc): when both are finely divided the mixture can be exploded by heat, percussion and sometimes, light friction.
- d) Bromine: the foil react with the liquid at 15C and incandescence occurs on warming in the vapor.
- e) Butanol: severely attacked the metal in an autoclave at around 100C liberating flammable hydrogen and causing a sharp rise in pressure. Other alcohol's would behave similarly.
- f) Calcium sulfate: violent explosion.
- g) Chlorates (barium, calcium, magnesium, potassium, sodium or zinc): when both are finely divided the mixture can be exploded by heat, percussion and sometimes, light friction.
- h) Chlorine Fluoride: possible ignition.
- i) Chlorine Trifluoride and carbon: violent reaction.
- j) Chlorofluorocarbons: contact with fresh metal surfaces may result in intense exothermic reactions.
- k) Chloromethane, Liquefied: possible ignition due to formation of an alkylaluminum compound.
- l) Copper and Sulfate: possible explosion in a silica vacuum tube @ 900-1000C.
- m) Copper Oxide: strong explosion on heating.
- n) Diobrane: interaction give complex hydrides which may ignite in air.



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REACTIVITY DATA CONTINUED

- o) 1,2-Difluorotetrafluoroethane: contact with fresh metal surfaces may result in intense exothermic reactions.
- p) Ethylene Dichloride, propylene dichloride and orthodichlorobenzene: explosive reaction.
- q) Fluorochloro lubricants: explosive reaction with fresh aluminum surfaces under pressure.
- r) Hydrochloric acid: the metal is attacked violently by the aqueous acid.
- s) Hydrogen Chloride: vigorous exothermic reaction.
- t) Iodates (barium, calcium, magnesium, potassium, sodium or zinc): when both are finely divided, the mixture can be exploded by heat, percussion, and sometimes light friction.
- u) Iodine: violent reaction in the presence of water as liquid, vapor or that present in hydrated salts.
- v) Iodine Monochloride: the metal foil ignites spontaneously and burns with a bluish-white flame after continued contact.
- w) Iodine Heptafluoride: interaction on heating with evolution of heat and light.
- x) Iodine Pentafluoride: ignition on prolonged contact.
- y) Iron Oxide: impact between an aluminum object and a rusty surface may cause sparks, possibly initiating an exothermic reaction.
- z) Lead Oxide: violent reaction.
- aa) Mercury II Salts: in contact with the foil, in the presence of moisture, a vigorous amalgamation reaction ensues.
- bb) Methanol and carbon tetrachloride (9:1): rapid autocatalytic dissolution of the metal.
- cc) Methyl bromide: possible ignition and explosion.
- dd) Monobromotrifluoromethane: contact with fresh metal surfaces may result in intense exothermic reactions.
- ee) Palladium: if an aluminum sheath surrounding a palladium core about .0025" diameter is heated to the melting point of aluminum, 600C. an alloying reaction takes place with production of a brilliant flash and a temperature of 2,800C.
- ff) Platinum: thin layers on aluminum foil or wire are used as igniters due to the intense heat of alloy formation which is sufficient to melt the intermetallic compounds.
- gg) Polytrifluoroethylene greases or oils: explosive reaction with fresh aluminum surfaces under pressure.
- hh) Potassium Hydroxide: vigorous reaction with evolution of flammable hydrogen.
- ii) Potassium Sulfate: violent explosion on melting.
- jj) Propylene Dichloride: rapid decomposition may occur.
- kk) Silicon and Lead oxide: explosion on heating.
- ll) Sodium Carbonate: explosion when applied to the red-hot metal.
- mm) Sodium Peroxide: ignition under high friction at 240C when the metal is finely divided.
- nn) Sodium Sulfate: violent explosion on melting.
- oo) Sulfuric acid, hot, concentrated: attacks the metal with evolution of flammable hydrogen.
- pp) Tetrachloroethylene: violent reaction.
- qq) Tetrafluoromethane: contact with fresh metal surfaces may result in intense exothermic reactions.
- rr) 1,1,1-Trichloroethane: violent decomposition with evolution of hydrogen.



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SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: **No special precautions indicated.**

WASTE DISPOSAL METHOD: **Observe all federal, state and local regulations when storing or disposing of this substance. For assistance, contact the district director of the Environmental Protection Agency.**

STORAGE: **Store away from incompatible materials.**

SPECIAL PROTECTIVE INFORMATION

VENTILATION: **provide local exhaust ventilation and/or general dilution ventilation to meet published exposure limits.**

RESPIRATOR: **the following respirators are recommended based on information found in the Physical data, toxicity and health effects sections. They are ranked in order from minimum to maximum respiratory protection. The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration.**

- a) **Dust, mist and fume respirator.**
- b) **Powered air purifying respirator with a dust, mist and fume filter.**
- c) **Type "C" supplied-air respirator with a full face piece operated in pressure demand or other positive pressure mode or with a full face piece, helmet or hood operated in continuous flow mode.**
- d) **Self contained breathing apparatus with a full face piece operated in pressure demand or other positive pressure mode.**

For fire fighting and other immediately dangerous to life or health conditions:

- a) **Self contained breathing apparatus with full face piece operated in pressure demand or other positive mode.**
- b) **Supplied air respirator with full face piece and operated in pressure demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure demand or other positive pressure mode.**

CLOTHING: **Protective clothing is not required. Avoid repeated or prolonged contact with this substance.**

GLOVES: **Protective gloves are not required but recommended.**

EYE PROTECTION: **Eye protection is not required, but advisable.**



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SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING/STORAGE:

Wash thoroughly after handling. Keep container closed.

TRANSPORTATION REQUIREMENTS

DOT CLASS:

Not Classified

UN NUMBER:

NC

IMCO CLASS:

NC

OTHER:

PRECAUTIONARY LABELING

NONE

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NA= NOT APPLICABLE

ND= NO DATA FOUND

NR=NOT RECORDED