STANFORD ADVANCED MATERIALS

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

DATE OF LAST REVISION: 06-24-96

CHEMICAL IDENTITY

LABEL IDENTITY	**Aluminum, silicon, copper mixture**		
CHEMICAL SYNONYM(S)	**Aluminum, silicon, copper alloy**		
CHEMICAL FAMILY	**Metallic Elements**		
FORMULA	**Al**	**Si**	**Cu**
MOLECULAR WEIGHT	**26.981539**	**28.0855**	**63.546**
CAS REGISTRY NUMBER	**7429-90-5**	**7440-21-3**	**7440-50-8**

(the data that follows is for the individual elements and not the mixture as a whole)

INGREDIENTS	%	PEL	TLV
Aluminum	**99.8 to 90%**	**Not established**	**10mg/m3**
Silicon	**00.1 to 5.0%**	**10mg/m3 (total dust)** **5mg/m3 (respirable dust)**	**10mg/m3**
Copper	**00.1 to 5.0%**	**0.1mg/m3 (fume)** **1mg/m3 (dust, mist)**	**0.2mg/m3 (fume)** **1mg/m3 (dust, mist)**

PHYSICAL AND CHEMICAL PROPERTIES

COLOR, FORM AND ODOR	**Silvery colored metal, odorless**
BOILING POINT	**Unknown**
VAPOR DENSITY (air=1)	**NA**
VAPOR PRESSURE @ 20°	**Unknown**
% VOLATILE BY VOLUME (%)	**NA**
REACTION WITH WATER	**ND**
EVAPORATION RATE (butyl acetate=1)	**Essentially 0**
SOLUBILITY IN WATER	**Insoluble**
MELTING POINT	**Unknown**
SPECIFIC GRAVITY	**Unknown**

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	**ND**
AUTOIGNITION TEMPERATURE (°C)	**ND**
FLAMMABILE LIMITS IN AIR, % by volume	**Upper & Lower: no data**
EXTINGUISHING MEDIA	**DO NOT USE WATER, use carbon dioxide, dry chemical extinguishing agents, dry sand or dry ground dolomite.**
SPECIAL FIRE FIGHTING PROCEDURES	**No special fire fighting procedures needed, use normal procedures which include wearing NIOSH/MSHA approved self-contained breathing apparatus, flame and chemical resistant clothing; hats, boots and gloves. If without risk remove material from fire area.**

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HEALTH HAZARD INFORMATION

TOXICITY DATA:

	Aluminum	Silicon	Copper
LD50:	**No data**	**No data**	**No data**
LC50:	**No data**	**No data**	**No data**
Other:	**No data**	**No data**	**orl-hmn TDLO: 120mg/kg; intr-rat TDLO: 100mg/kg**

NFPA RATING:
HEALTH: **0** FLAMMABILITY: **0** REACTIVITY: **0** PERSONAL PROTECTION: **ND**

EFFECTS OF EXPOSURE:
Aluminum:
Acute:
Ingestion: causes a burning in the mouth and throat, vomiting and diarrhea.
Skin contact: may cause irritation.
Eye contact: may cause irritation.
Inhalation: may cause irritation.

MEDICAL CONDITIONS (IF ANY) AGGRAVATED BY THE CHEMICAL: **None known**
OTHER HEALTH HAZARDS: **None known**
MOST LIKELY ROUTES OF ENTRY: **Ingestion, inhalation and skin absorption.**
Chronic:
Ingestion: kidney and liver damage.
Skin contact: Aluminum salts can cause dermatitis, eczema.
Eye contact: with aluminum can cause corneal necrosis.
Inhalation: of aluminum fumes causes metal-fume fever.

Silicon:
Acute:
Ingestion: None known.
Skin contact: dust or powder may cause irritation.
Eye contact: dust or powder may cause irritation.
Inhalation: dust or powder may cause irritation.

MEDICAL CONDITIONS (IF ANY) AGGRAVATED BY THE CHEMICAL: **None known**
OTHER HEALTH HAZARDS: **None known.**
MOST LIKELY ROUTES OF ENTRY: **Ingestion**
Chronic:
Ingestion: None known.
Skin contact: None known.
Eye contact: powder or dust may cause irritation.
Inhalation: powder or dust may cause irritation.
Other: None know.

HEALTH HAZARD INFORMATION CONTINUED

Copper:

Acute:

Ingestion: **large doses may cause nausea, vomiting, abdominal pain, metallic taste and diarrhea. Acute poisoning is characterized by hemalysis, jaundice, anemia, hypertension and convulsions.**
Skin contact: **may cause irritation.**
Eye contact: **dust or powder may cause irritation.**
Inhalation: **dust or fumes may cause irritation, metallic taste, metal-fume fever, discoloration of skin and hair.**

MEDICAL CONDITIONS (IF ANY) AGGRAVATED BY THE CHEMICAL: **Pre-existing skin disorders, impaired liver, kidney or pulmonary function.**
OTHER HEALTH HAZARDS: **None known.**

Chronic:

Ingestion: **renal damage.**
Skin contact: **prolonged skin contact may produce sensitization, dermatitis. Chronic skin contact with copper solutions will cause erythema and other skin reactions in some individuals.**
Eye contact: **None known.**
Inhalation: **Atrophic changes and irritation of mucous membranes, renal damage.**

EMERGENCY AND FIRST AID PROCEDURES:

Aluminum:

Ingestion: **no data available but one should obtain medical attention.**
Skin contact: **remove contaminated clothing, flood skin with large amounts of water. If irritation persists seek medical attention.**
Eye contact: **immediately flush eyes, including under eyelids, with large amounts of water for at least 15 minutes. Call a physician.**
Inhalation: **no specific information available, one should obtain medical attention.**

Silicon:

Ingestion: **no data available but one should obtain medical attention.**
Skin contact: **remove contaminated clothing, flood skin with large amounts of water. If irritation persists seek medical attention.**
Eye contact: **immediately flush eyes, including under eyelids, with large amounts of water for at least 15 minutes. Call a physician.**
Inhalation: **No specific information available, one should obtain medical attention.**

Copper:

Ingestion: **no data available but one should obtain medical attention.**
Skin contact: **remove contaminated clothing, flood skin with large amounts of water.**
Eye contact: **immediately flush eyes, including under eyelids, with large amounts of water for at least 15 minutes. Call a physician.**
Inhalation: **no specific information available, one should obtain medical attention.**

REACTIVITY DATA

Aluminum:
Incompatibility materials: **acids, acid chlorides, oxidizing agents, halogens.**
Hazardous Decomposition Products: **toxic fumes of aluminum oxide; hydrogen when reacted with some acids and caustic solutions.**
Conditions to avoid: **Incompatibilities**
Stability: **Stable** Hazardous Polymerization: **Will not occur**
Other: **No data**

Silicon:
Incompatibility: **Alkali carbonates, aluminum + lead oxide, calcium, cesium carbide, chlorine, fluorine, sodium-potassium alloy, oxidizers, metallic halides, interhalogens, acids, strong bases, powdered metals, CoF2, MnF2.Rb2C2.**
Hazardous Decomposition Products: **SiO2, H2**
Conditions to avoid: **Incompatibilities**
Stability: **Stable** Hazardous Polymerization: **Will not occur**
Other: **when heated, will react with water or steam to produce hydrogen gas.**

Copper:
Incompatibility materials: **strong acids, strong oxidizers, halogens, acid chlorides, chlorates, bromates, iodates, C2H2, NH4NO3, ClF3, (Cl+F2), ethylene oxide, H2O2, hydrazine mononitride, hydrazoic acid, H2S, Pb(N3)2, K2O2, NaN3, Na2O2.**
Hazardous Decomposition Products: **toxic fumes**
Conditions to avoid: **Incompatible with prolonged heating in air.**
Stability: **Stable** Hazardous Polymerization: **Will not occur.**
Other: **powder and salts react with acetylene or hydrazonic acid making explosive compounds.**

ENVIRONMENTAL INFORMATION

RCRA CODE: **None**
TSCA Registered: **Yes**

SPILL AND LEAK PROCEDURES: **wearing full protective equipment, cover spill with dry sand or vermiculite. Mix well and carefully transfer to a container.**

WASTE DISPOSAL: **Consult state, local and federal EPA regulations for proper disposal.**

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SPECIAL PROTECTIVE INFORMATION

RESPIRATORY PROTECTION: **Use a high efficiency particle respirator if exposed to fine fumes.**
PROTECTIVE GLOVES: **Rubber**
EYE/FACE PROTECTION: **ANSI approved safety goggles**
VENTILATION REQUIREMENTS: **Laboratory fume hood**

SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING/STORAGE: **Keep containers tightly closed. Store in a cool, dry, well-ventilated area. Wash thoroughly after use.**

OTHER PRECAUTIONS: **Lab coat and apron, flame and chemical resistant coveralls, eyewash capable of sustained flushing, safety drench shower and hygienic facilities for washing.**

TRANSPORTATION REQUIREMENTS		
	DOT CLASS:	**ND**
	UN NUMBER:	**NONE**
	IMCO CLASS:	**ND**

This product contains Aluminum which is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR 372. (if fume or dust)

This product contains Copper which is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR 372.

NA= NOT APPLICABLE **ND= NO DATA FOUND** **NR=NOT RECORDED**