

SPI Supplies Division

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Material Safety Data Sheet

SPI# 05063-AB Silver Paste Plus™ Silver Paste

Section 01: Identification

Date Effective: June 7, 2010
(most recent revision)

Chemical Name/Synonyms:
Mixture

Chemical family:
Silver colloid in carrier with polymer

Emergencies
Use Only #'s:

Contacting CHEMTREC 24 Hour Emergency
Worldwide phone : 1-(703)-527-3887
Worldwide FAX : 1-(703)-741-6090
Toll-free phone : 1-(800)-424-9300



Product or Trade Name.... SPI #05063-AB Silver Paste Plus

CAS #..... Mixture, see below for individual components

Chemical Formula..... Mixture

Main use..... Mounting of samples for scanning electron microscopy; mounting of silicon wafers when producing high temperature thin film superconductor materials.

Secondary use..... PC board repairs and other electronic industry applications.

Section 02: Composition

Carcinogenicity:

CAS #	Chemical Name	V.P. mm Hg@20°C	Weight%
108-65-6	1-methoxy-2-propanol acetate	3.7	10-30
7440-22-4	silver, metallic		> 60
65859-05-4	Acrylic resin		5-10
Proprietary ingredients(s)			0.1-1

Section 03: Physical and Chemical Properties - Hazards Overview

Instability:

The product is normally stable.

Incompatibility:

Avoid contact with oxidizing agents, acetylene, ammonia, hydrogen peroxide, chlorine trifluoride, nitric acid, ethanol, strong bases, strong acids, strong oxidizing agents, ethylenimine, oxalic acid, tartaric acid, bromoazide.

Decomposition:

Decomposition products: Carbon dioxide, metal fumes, metal oxides, carbon monoxide, ethyl methacrylate, water, methyl acrylate

Polymerization:

This product does not normally polymerize significantly.

Section 04: Fire and Explosion Data

Flashpoint: 50.5°C (123 °F) Closed Cup
53.3°C (128 °F) Seta Closed Cup

Fire and Explosion Hazards:

Keep away from sparks and open flames! Do not smoke in area with open product; if there is a chance of the product being heated above its flashpoint during processing, remove all sources of ignition such as open sparks, flames or static discharge to prevent vapor ignition.

Extinguishing Media:

Water spray, dry chemical, or carbon dioxide.

Special Firefighting Information:

Toxic decomposition products may form under fire conditions (See decomposition section). Wear full protective clothing and a full facepiece, positive pressure, self-contained breathing apparatus (SCBA); Decontaminate contaminated clothing and equipment with soap and water. Dispose of residues per federal, state, and local regulation (See waste disposal section).

Section 05: Health Hazard Information**Overview:**

The most likely route of overexposure to components of this product is inhalation. During room temperature use, such as dispensing and screen printing, or even application to specimens being prepared for SEM examination, volatile solvents and organics will start evaporating. During drying (some might say "curing", but which is a technically incorrect description) at 100-150 °C (212 - 302 °F), most of the volatile solvents and organics will evaporate. Some low volatility organics will start to evaporate. During firing, 600-900°C, all remaining organics will burn off. Small quantities of nonrefractory metals and metal oxides, such as lead or cadmium, if present in the product may vaporize to rapidly recondense outside the high temperature regions of the furnace. Laser trimming resistors can also volatilize small amounts of metals and metal oxides. Personal performing maintenance/repairs on furnaces, filters or ducts may need respirators for protection from accumulated respirable metal oxides. Overexposure to other chemicals used in the operation should be considered also, such as cleaning solvents used in screen printing and dispensing. Well designed area and personal air sampling and analysis can show if exposures are within established limits. Well designed local ventilation and process enclosures, such as for ovens, furnaces, lasers, and screen printers, are effective ways to limit employee exposure where needed.

In addition to meeting exposure limits, it is always prudent to use all practical means to limit employee exposure to all chemicals. A significant difference in overall exposure can be made by practical measures such as:

Inhalation: Minimizing by keeping the tubes and/or tins of this product and solvent and waste disposal containers of solvent damp wipes tightly closed.

Skin: Avoiding contact by using proper gloves

Ingestion: Avoiding by washing hands before eating, drinking or smoking, and restricting these activities to outside the work area.

Eyes: Avoiding contact by wearing chemical splash goggles where there is a splash potential.

Section 06: Hazards Identification - Principal Health Effects

1-methoxy-2-propanol acetate

Toxic effects described in animals include:

Skin or eye contact: Mild skin irritation, eye irritation.

Toxic effects of repeated or prolonged animal exposures include:

By skin or eye contact: Skin effects

By inhalation: Respiratory effects; degeneration of the olfactory epithelium; renal effects; disturbed equilibrium; nonspecific effects, that is, weight loss and irritation; Liver effects;

Additional animal tests have shown no genetic damage in bacterial or mammalian cell cultures, no developmental toxicity

Human health effects of overexposure may include:

By skin or eye contact: Skin irritation with discomfort or rash; eye irritation with discomfort, tearing, or blurring of vision.

By inhalation: Nonspecific discomfort, that is, nausea, headache or weakness

Human effects of higher level acute, repeated or chronic overexposure may include:

By inhalation: Irritation of the upper respiratory passages with coughing and discomfort.

Also: Animal tests indicate commercial grade 1-methoxy-2-propanol acetate does not cause developmental toxicity. However, tests of pure 2-methoxy-1-propanol acetate in rabbits and rats by inhalation have shown developmental toxicity. 2-methoxy-1-propanol acetate did not show developmental toxicity by skin contact. 2-methoxy-1-propanol acetate is present in commercial grade 1-methoxy-2-propanol acetate in low concentrations.

Fatty Acid Derivative:

No information

Silver (Metallic):

Additional animal studies have shown:

Genetic damage in mammalian cell cultures; no genetic damage in bacterial cell cultures; no animal test reports are available to define carcinogenic, developmental, or reproductive hazards.

Human health effects of overexposure may include:

By skin contact: May cause irritation

By eye contact: May cause irritation; photophobia

By inhalation or contact: Argyria, a blue-gray discoloration of the skin, mucous membranes, inner surface of the eyelids, cornea, or lens.

Human effects of higher level acute, repeated or chronic overexposure may include:

By inhalation or contact: Argyria

In addition: There is no effective treatment for argyria. Cases of argyria have not resulted from exposure to silver concentrations in air of less than 0.01 mg/m³.

Acrylic resin:

Toxic effects described in animals include:
Slight skin irritation; slight eye irritation.

Human health effects of overexposure may include:
Nonspecific discomfort, e.g. nausea, headache, or weakness; eye irritation with discomfort, tearing or blurring of vision; irritation of the upper respiratory passages; allergic skin rashes; dizziness.

Proprietary ingredients:

Human health effects of overexposure may include:

By skin contact: May irritate skin

By eye contact: Eye irritation with discomfort, tearing, or blurring of vision.

By inhalation: Irritation of the upper respiratory passages.

Individuals may have increased susceptibility to the hazards of overexposure to ingredient(s) of this product if they have pre-existing diseases of the skin, central nervous system, eyes, spleen, lungs, liver, and kidneys.

Animal Data:

1-Methoxy-2-Propanol Acetate

Skin absorption LD50: 5,000 mg/kg in rabbits

Oral LD50: 8,532 mg/kg in female rats

Silver (metallic)

Oral LD50 (mice): > 5 g/kg 5000mg/kg

Acrylic resin

Inhalation 1 hour LC50: 2 mg/L in rats
 Skin absorption LD50: >3000 mg/kg in rabbits
 Oral LD50: > 5000 mg/kg in rats

Carcinogenicity listing:

No ingredients of this product are designated by IARC, NTP, OSHA, ACGIH as potential carcinogens.

Exposure limits:

Work place exposures should be kept below the following limits:

Name/Units	AIHA	ACGIH	OSHA
	8 hr 15 min	8 hr 15 min	8 hr 15 min
Methyl acrylate/ppm	---	2 (skin)	10 (skin)
Metallic silver/mg/m3 Particulates, N.O.S.,	---	0.1	0.01
Propylene glycol monomethyl ether acetate/mg/m3	100		

Notes on exposure limits:

PELs: OSHA Permissible Exposure Limits - 29 CFR 1910.1000, Subpart Z, or specific substance standards.

TLVs - ACGIH Threshold Limit Values -
 published by American Conference of Governmental Industrial Hygienists,
 6500 Glenway Avenue, Cincinnati, OH 45211 USA

WEELs - AIHA Workplace Environmental Exposure Limits -
 published by the American Industrial Hygiene Association,
 2700 Prosperity Avenue, Suite 250, Fairfax, VA 22031

Section 07: First Aid Instructions**Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash contaminated clothing before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

Inhalation:

If inhaled, remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

If swallowed, immediately give two glasses of water and induce vomiting. Never give anything by mouth to an unconscious person. Call a physician immediately.

Section 08: Protection Information

Adequate local ventilation should be used to keep exposures below applicable limits. Other engineering controls such as totally enclosed handling systems are also preferred. Respiratory protection will be needed if exposures can not be kept below applicable limits by other means.

Respiratory protection:

If respirators are needed to meet applicable limits, a respiratory protection program up to the level of OSHA Standard 29 CFR 1910.134 is mandatory. This includes air monitoring, selection, medical approval, training, fit testing, inspection, maintenance, cleaning, storage, etc. Selection of a suitable respirator will depend on the properties of the contaminant(s) and their actual or expected air concentration(s) vs. applicable limits. Consult ANSI Standard Z88.2 for decision logic to select appropriate NIOSH/MESA approved respirators.

Respirators with organic vapor cartridges provide adequate protection, within use limitations, for the following components in this product:

Toluene

Gloves:

Gloves should be used when the possibility of skin contact exists; the suitability of a particular glove and glove material should be determined as part of an overall glove program. Considerations may include chemical breakdown time, permeation rate, abrasion, cut and puncture resistance, flexibility, duration of contact, etc.

Recommended glove materials:

NBR (nitrile-butadiene rubber), polyethylene or vinyl for very limited exposure based on reported experiences. Because the product is a complex mixture and formulated composition, glove testing may be appropriate as part of the glove selection process.

Other protection practices:

Appropriate eye protection such as chemical splash goggles should be used if the possibility of eye contact exists; protective outer clothing should be used where the possibility of body contact exists. Contaminated work clothing should not be allowed out of the workplace. Do not smoke, consume or store food or drinks in areas where the product is handled and stored. After handling the product, wash hands thoroughly before leaving the work area.

Additional engineering controls, work practices, and training may be required depending on exposure levels. There are discussed in OSHA Respiratory Protection Standard (29CFR 1910.134) and OSHA Hazard Communication Standard (29 CFR 1910.1200).

Do not breath dust. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling.

Section 09: Disposal Information

Spill, leak, or release:

For small spills: Absorb on rags, sand or other absorbant material.

For large spills:

Get workers out of the affected area. If flammable liquids or vapors may be present, turn off electrical devices or other sources of sparks or flames. Wear protective equipment. Use supplied-air respiratory protection if vapor concentrations are not known. Contain spill at source by diking or absorbing with sand. Do not allow spill to spread to or intentionally flush to sewer or ground. Wash area thoroughly. Adequately ventilate area; spill residue, cleaning rags and absorbant may be refined to recover the precious metal content.

Waste disposal:

Components of this product may be considered hazardous; waste product may be refined to recover precious metal content.

Section 10: Product Information

Contaminated Items:

Empty product containers, contaminated clothing and cleaning materials, etc. should be considered hazardous until decontaminated or properly disposed of. See Waste Disposal Section.

Section 11: Additional Toxicological Information

No further information known.

Section 12: Ecological Information

Exotoxicity: Exotoxicity is expected to be low based on the relatively tiny amounts used in each product put up.

Environmental Fate: No information found in our selected references.

Bioaccumulation: Not expected to occur.

Section 13: Transport Information

Shipping information:

Shipping name: Paint Related Material

Hazard Class: 3

UN/NA Class: UN1263

Label: Flammable liquid

Packing Group III

Section 14: Regulatory Information

TSCA: All components of this product are listed on the TSCA 8(b) inventory. If identified components of this product are listed under the TSCA 12(b) Export Notification Rule, they will be listed below.

TSCA 12(b) Component	Listed under TSCA Section
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SARA-Title 3, Section 313 Emissions Reporting Information (40 CFR 372)

This product contains a chemical which is listed in Section 313 at or above de minimus concentrations. The following listed chemicals are present:

CAS Number	Description	%
7440-22-4	Metallic Silver	> 60

California Prop. 65:

Proposition 65 requires manufacturers or distributors of consumer products into the State of California to provide a warning statement if the product contains ingredients for which the State has found to cause cancer, birth defects or other reproductive harm. If this product contains an ingredient listed by the State of California to cause cancer or reproductive toxicity, it will be listed below:

Ingredient(s)/CAS#	Weight %
Toluene / 108-88-3	< 0.1

This product is a physical mixture. The health effects information about this product is based on the individual ingredients. The data in this Materials Safety Data Sheet (MSDS) relates only to the specific product designated herein and does not relate to its use in combination with any other material or in any process.

Canadian WHMIS Classification: Class B, Div. 3; D2B

Section 15: Other Information

If this product should be used in ways that are outside of the intended applications in scanning electron microscope laboratories, and if it is going to be formulated into some other system, so that it becomes just another component of that other system, read the MSDS sheets for the other components before blending as the resulting mixture may have the hazards of all of its parts.

Disclaimer of Liability:

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