M. E. Taylor Engineering, Inc.
15817 Crabbs Branch Way
Rockville, MD 20855

Material Safety Data Sheet

Revision Date February 4th, 2005	**Technical Information** 1-301-975-9798 or support@semicro.org
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For updates please download from www.semicro.org or phone 1-301-975-9798

Section 1: Product Identification

MSDS Code: PEN **Name: Silver Conductive Pen**

Related Part Numbers: PEN

Use: Repair of conductive traces on Circuit Boards.

Section 2: Hazardous Ingredients

CAS#	Chemical Name	% by weight	ACGIH TWA	Osha Pel	Osha Stel
7440-22-4	silver	30 – 60	1mg/m^3	1mg/m^3	n/e
108-88-3	toluene	7 – 13	50 ppm	100 ppm	150 ppm
110-19-0	2-methylpropyl ester acetic acid	7 – 13	150 ppm	150 ppm	n/e
123-86-4	n-butyl acetate	7 – 13	150 ppm	150 ppm	200 ppm
64-17-5	ethyl alcohol	1 – 5	200 ppm	200 ppm	250 ppm
110-43-0	2-heptanone	1 – 5	50 ppm	100 ppm	n/e
141-78-6	ethyl acetate	1 – 5	400 ppm	400 ppm	n/e
67-63-0	2-propanol	0.1 – 1	400 ppm	400 ppm	500 ppm

Section 3: Hazards Identification

WHMIS Codes: B3, D2B

NFPA Ratings: Health 1 Flammability 3 Reactivity 0

HMIS Ratings: Health 1 Flammability 3 Reactivity 0

Eyes: Liquid in contact with eyes may cause permanent eye damage.

Skin: May cause skin irritation and possible pain/stinging if the skin is abraded.

Inhalation: Solvents may cause respiratory tract irritation, headache, and possible dizziness.

Ingestion: May cause respiratory and digestive tract irritation.

Chronic: None.

Section 4: First Aid Measure

Eyes: Remove contact lenses. Flush with water or saline for 20 minutes. Get medical aid.

Skin: Thoroughly wash skin with large quantities of soap and water. Get medical aid if symptoms persist.

Inhalation: Immediately remove from exposure to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Ingestion: Do not induce vomiting. If conscious, give 1-2 glasses of water. Get medical aid.

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Section 5: Fire Fighting Measures

Autoignition Temperature:	465°C	**Flash Point:**	-18°C	**LEL / UEL:**	1 / 36

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.

General Information: Will burn if involved in a fire. Flash back along vapor trail is possible.

Section 6: Accidental Release Measures

Spill Procedure: Remove all sources of ignition. Provide adequate ventilation. Wear appropriate personal protection. Sprinkle absorbent compound onto spill, then sweep into a plastic or metal container. Wipe up further residue with paper towel and place in container. Wash spill area with soap and water.

Section 7: Handling and Storage

Handling: Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Do not ingest or inhale. Do not expose container to heat or flame.

Storage: Keep away from sources of ignition. Store container in a cool, dry, and well ventilated area away from incompatible substances. Keep from freezing.

Section 8: Exposure Controls

Routes of entry: Eyes, ingestion, inhalation, and skin.

Ventilation: Use adequate general or local exhaust ventilation to keep airborne concentrations below exposure limits.

Personal Protection: Wear appropriate protective eyeglasses or chemical safety goggles. Wear appropriate protective clothing to prevent skin contact. Use a NIOSH approved respirator when necessary.

Section 9: Physical and Chemical Properties

Physical State:	liquid	**Odor:**	ethereal	**Solubility:**	partial	**Evaporation Rate:**	fast		
Boiling Point:	59°C	**Specific Gravity:**	1.85	**Vapor Pressure:**	1 psi @ 21°C	**Vapor Density:**	4.1 (Air=1)	**pH:**	7

Section 10: Stability and Reactivity

Stability: Stable at normal temperatures and pressures.

Conditions to avoid: Temperatures over 40°C or below 0°C, ignition sources, and incompatible substances.

Incompatibilities: Alkali and alkaline earth metals, powdered aluminum, zinc, magnesium, and beryllium, lithium aluminum hydride, potassium tert-butoxide, nitrates, strong acids, strong oxidizers, chlorosulphonic acid, hydrogen peroxide.

Polymerization: Will not occur.

Decomposition: Carbon dioxide, carbon monoxide, nitrogen oxides.

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Section 11: Toxicological Information

Sensitization: (effects of repeated exposure) — Prolonged or repeated skin contact may cause dermatitis.

Carcinogenicity: (risk of cancer) — No

Teratogenicity: (risk of malformation in an unborn fetus) — This product contains zylene, a known embryotoxin. Pregnant women must avoid all contact with this product.

Reproductive Toxicity: (risk of sterility) — Toluene is listed under **California Proposition 65** under chemicals known to cause reproductive toxicity.

Mutangenicity: (risk of heritable genetic effects) — No

Lethal Exposure Concentrations:	**Ingestion (LD50):**	7400 mg/kg (rat)	**Inhalation (LC50):**	16000 ppm/4h (rat)	**Skin (LD50):**	n/e

Section 12: Ecological Information

General Information: Avoid runoff into storms and sewers which lead into waterways. Water runoff can cause environmental damage.

Environmental Impact Data: (percentage by weight)

CFC:	0	**HFC:**	0	**Cl.Solv.:**	0	**VOC:**	53	**HCFC:**	0	**ODP:**	0

Section 13: Disposal Information

General Information: Dispose of in accordance with all local, provincial, state, and federal regulations. Water runoff can cause environmental damage.

Section 14: Transportation Information

Ground: (all sizes 5 liters or less)

Non-regulated, ORM-D

Air:

Shipper must be trained and certified. Refer to IATA regulations.

Sea:

Shipper must be trained and certified. Refer to IMDG regulations.

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Section 15: Regulatory Information

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations.

SARA (Superfund Amendments and Reauthorization Act of 1986, USA, 40 CFR 372.4)

None of the chemicals in this product have a reportable quantity.

EPCRA (Emergency Planning and Right to Know Act, USA, 40 CFR 372.45)

This product contains the following chemicals subject to the reporting requirements of section 313 Title III of the SARA of 1986 and 40 CFR part 372: Methanol (CAS #67-56-1, 2% by weight)

TSCA (Toxic Substances Control Act of 1976, USA)

All substances are TSCA listed.

CAA (Clean Air Act, USA)

This product does not contain any class 1 ozone depletors.

This product does not contain any class 2 ozone depletors.

This product contains methanol (CAS #67-56-1, 2% by weight), listed as a hazardous air pollutant.

California Proposition 65 (Chemicals know to cause cancer or reproductive toxicity, May 1, 1997 revision, USA)

This product contains toluene, listed under chemicals known to the state to cause reproductive toxicity.

Health Canada

Labeling and containers used in this product are listed in compliance with Consumer Chemicals and Container regulations.

Environment Canada

Chemicals in this product are listed on the Domestic Substances List in the Canadian Environmental Protection Act

This product does not contain any ozone depleting substances.

Industry and Science Canada

Labeling, product identity, net quantity declaration, minimum printing type size heights, and packaging of this product is in compliance with the Consumer Packaging and Labeling Act and Regulations. This product is not slack filled in accordance to chapter 4 prohibitions.

RoHS (The restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2004).

This product is RoHS compliant.

Section 16: Other Information

Definitions: n/a = not applicable, n/e = not established

Disclaimer: This material safety data sheet is provided as an information resource only. M. E. Taylor Engineering believes the information contained herein is accurate and compiled from reliable sources. It is the responsibility of the user to verify its validity. The buyer assumes all responsibility of using and handling the product in accordance with federal, state, and local regulations.