

DOW CORNING CORPORATION

Material Safety Data Sheet

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Version: 1.4

Revision Date: 2005/04/01

DOW CORNING(R) PI-2000 HIGHLY CONDUCTIVE SILVER INK

1. PRODUCT AND COMPANY IDENTIFICATION

Dow Corning Corporation
South Saginaw Road
Midland, Michigan 48686

24 Hour Emergency Telephone: (989) 496-5900
Customer Service: (989) 496-6000
Product Disposal Information: (989) 496-6315
CHEMTREC: (800) 424-9300

MSDS No.: 04040994

Revision Date: 2005/04/01

Generic Description: Epoxy resin
Physical Form: Paste
Color: Grey.
Odor: Slight odor

NFPA Profile: Health 2 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

2. OSHA HAZARDOUS COMPONENTS

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
112-34-5	10.0 - 30.0	Diethylene glycol monobutyl ether
None	5.0 - 10.0	Vendor Proprietary Ingredient
872-50-4	5.0 - 10.0	N-Methylpyrrolidone
25068-38-6	3.0 - 7.0	Bisphenol A-epichlorohydrin copolymer

The above components are hazardous as defined in 29 CFR 1910.1200.

3. HAZARDS IDENTIFICATION

Potential Health Effects

Acute Effects

Eye: Direct contact may cause severe irritation.

Skin: May cause moderate irritation.

Inhalation: Vapor may irritate nose and throat. Vapor overexposure may cause drowsiness.

Oral: No known applicable information.

Prolonged/Repeated Exposure Effects

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Skin:	Repeated skin contact may cause allergic skin reaction. Overexposure by skin absorption may injure the following organ(s): Blood.
Inhalation:	Repeated exposures may cause allergic respiratory reaction. Overexposure by inhalation may injure the following organ(s): Kidneys. Blood. Lungs. Respiratory system. Spleen. Bone marrow. Thymus.
Oral:	Overexposure by ingestion may injure the following organ(s): Kidneys. Blood. Spleen. Bone marrow. Thymus.

Signs and Symptoms of Overexposure

No known applicable information.

Medical Conditions Aggravated by Exposure

No known applicable information.

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

4. FIRST AID MEASURES

Eye:	Immediately flush with water for 15 minutes. Get medical attention.
Skin:	Remove from skin and immediately flush with water for 15 minutes. Get medical attention if irritation or ill effects develop or persist.
Inhalation:	Remove to fresh air. Get medical attention if ill effects persist.
Oral:	Get medical attention.
Comments:	Treat according to person's condition and specifics of exposure.

5. FIRE FIGHTING MEASURES

Flash Point:	> 213.8 °F / > 101 °C (Closed Cup)
Autoignition Temperature:	Not determined.
Flammability Limits in Air:	Not determined.
Extinguishing Media:	On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO ₂), dry chemical or water spray. Water can be used to cool fire exposed containers.
Fire Fighting Measures:	Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.

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Unusual Fire Hazards: None.

Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following hazardous decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Chlorine compounds. Metal oxides. Hexamethylene diisocyanate. Hydrogen Cyanide. Nitrogen oxides. Formaldehyde.

6. ACCIDENTAL RELEASE MEASURES

Containment/Clean up: Observe all personal protection equipment recommendations described in Sections 5 and 8. Wipe up or scrape up and contain for salvage or disposal. Clean area as appropriate since spilled materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See section 8 for Personal Protective Equipment for Spills. Call (989) 496-5900, if additional information is required.

7. HANDLING AND STORAGE

Use with adequate ventilation. This product contains a methyl ethyl ketoxime (MEKO) blocked polyisocyanate based on hexamethylene diisocyanate (HDI). The blocked isocyanate product is considered essentially unreactive at room temperature. Free isocyanate and MEKO may be released when this product is heated above 130 degrees C (266 degrees F). At these temperatures, care should be taken to control exposure within the exposure limits for MEKO (Vendor Guide: TWA 3 ppm; STEL 10 ppm. AIHA WEEL: TWA 10 ppm) and the exposure limits for HDI (ACGIH: TWA 0.005 ppm). Avoid eye exposure. Avoid skin contact. Do not breathe vapor, mist, dust, or fumes. Keep container closed. Do not take internally.

Use reasonable care and store away from oxidizing materials.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Component Exposure Limits**

<u>CAS Number</u>	<u>Component Name</u>	<u>Exposure Limits</u>
872-50-4	N-Methylpyrrolidone	AIHA WEEL: TWA 10 ppm, skin.

Engineering Controls

Local Ventilation: Recommended.
General Ventilation: Recommended.

DOW CORNING(R) PI-2000 HIGHLY CONDUCTIVE SILVER INK**Personal Protective Equipment for Routine Handling**

Eyes:	Use chemical worker's goggles.
Skin:	Wash at mealtime and end of shift. If skin contact occurs, change contaminated clothing as soon as possible and thoroughly flush affected areas with cool water. Chemical protective gloves are recommended.
Suitable Gloves:	Butyl Rubber. Nitrile Rubber.
Inhalation:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. IH personnel can assist in judging the adequacy of existing engineering controls.
Suitable Respirator:	General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators.

Personal Protective Equipment for Spills

Eyes:	Use full face respirator.
Skin:	Wash at mealtime and end of shift. If skin contact occurs, change contaminated clothing as soon as possible and thoroughly flush affected areas with cool water. Chemical protective gloves are recommended.
Inhalation/Suitable Respirator:	Respiratory protection recommended. Follow OSHA Respirator Regulations (29 CFR 1910.134) and use NIOSH/MHSA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.
Precautionary Measures:	Avoid eye exposure. Avoid skin contact. Do not breathe vapor, mist, dust, or fumes. Keep container closed. Do not take internally. Use reasonable care.
Comments:	This product contains a methyl ethyl ketoxime (MEKO) blocked polyisocyanate based on hexamethylene diisocyanate (HDI). The blocked isocyanate product is considered essentially unreactive at room temperature. Free isocyanate and MEKO may be released when this product is heated above 130 degrees C (266 degrees F). At these temperatures, care should be taken to control exposure within the exposure limits for MEKO (Vendor Guide: TWA 3 ppm; STEL 10 ppm. AIHA WEEL: TWA 10 ppm) and the exposure limits for HDI (ACGIH: TWA 0.005 ppm).

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

9. PHYSICAL AND CHEMICAL PROPERTIES

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Physical Form: Paste
 Color: Grey.
 Odor: Slight odor
 Specific Gravity @ 25°C: 3.4
 Viscosity: Not determined.
 Freezing/Melting Point: Not determined.
 Boiling Point: Not determined.
 Vapor Pressure @ 25°C: Not determined.
 Vapor Density: Not determined.
 Solubility in Water: Not determined.
 pH: Not determined.
 Volatile Content: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.
 Hazardous Polymerization: Hazardous polymerization will not occur.
 Conditions to Avoid: None.
 Materials to Avoid: Oxidizing material can cause a reaction.

11. TOXICOLOGICAL INFORMATION**Component Toxicology Information**

Prolonged absorption of silver compounds can lead to grayish blue discoloration of the skin known as Argyria or Argyrosis.

Special Hazard Information on Components**Teratogens**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>	
872-50-4	5.0 - 10.0	N-Methylpyrrolidone	Evidence of teratogenicity (birth defects) in laboratory animals.

Reproductive Effects

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>	
872-50-4	5.0 - 10.0	N-Methylpyrrolidone	Evidence of reproductive effects in laboratory animals.

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Sensitizers

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>	
None	5.0 - 10.0	Vendor Proprietary Ingredient	Possible skin sensitizer. Possible respiratory sensitizer.
25068-38-6	3.0 - 7.0	Bisphenol A-epichlorohydrin copolymer	Known skin sensitizer.

12. ECOLOGICAL INFORMATION

Environmental Fate and Distribution

Complete information is not yet available.

Environmental Effects

Complete information is not yet available.

Fate and Effects in Waste Water Treatment Plants

Complete information is not yet available.

Ecotoxicity Classification Criteria

Hazard Parameters (LC50 or EC50)	High	Medium	Low
Acute Aquatic Toxicity (mg/L)	<=1	>1 and <=100	>100
Acute Terrestrial Toxicity	<=100	>100 and <= 2000	>2000

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

13. DISPOSAL CONSIDERATIONS

RCRA Hazard Class (40 CFR 261)

When a decision is made to discard this material, as received, is it classified as a hazardous waste? Yes

TCLP: D011

State or local laws may impose additional regulatory requirements regarding disposal.

Call (989) 496-6315, if additional information is required.

14. TRANSPORT INFORMATION

DOT Road Shipment Information (49 CFR 172.101)

Not subject to DOT.

DOW CORNING(R) PI-2000 HIGHLY CONDUCTIVE SILVER INK**Ocean Shipment (IMDG)**

Not subject to IMDG code.

Air Shipment (IATA)

Not subject to IATA regulations.

15. REGULATORY INFORMATION

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

EPA SARA Title III Chemical Listings**Section 302 Extremely Hazardous Substances (40 CFR 355):**

None.

Section 304 CERCLA Hazardous Substances (40 CFR 302):

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
7440-22-4	80.0	Silver

Section 311/312 Hazard Class (40 CFR 370):

Acute: Yes
 Chronic: Yes
 Fire: No
 Pressure: No
 Reactive: No

Section 313 Toxic Chemicals (40 CFR 372):

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
7440-22-4	80.0	Silver
112-34-5	12.5	Diethylene glycol monobutyl ether
872-50-4	5.0	N-Methylpyrrolidone

Supplemental State Compliance Information**California**

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Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>	
872-50-4	5.0 - 10.0	N-Methylpyrrolidone	Developmental toxin.

Massachusetts

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
7440-22-4	> 60.0	Silver
872-50-4	5.0 - 10.0	N-Methylpyrrolidone

New Jersey

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
7440-22-4	> 60.0	Silver
112-34-5	10.0 - 30.0	Diethylene glycol monobutyl ether
None	5.0 - 10.0	Vendor Proprietary Ingredient
872-50-4	5.0 - 10.0	N-Methylpyrrolidone
25068-38-6	3.0 - 7.0	Bisphenol A-epichlorohydrin copolymer

Pennsylvania

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
7440-22-4	> 60.0	Silver
112-34-5	10.0 - 30.0	Diethylene glycol monobutyl ether
None	5.0 - 10.0	Vendor Proprietary Ingredient
872-50-4	5.0 - 10.0	N-Methylpyrrolidone
25068-38-6	3.0 - 7.0	Bisphenol A-epichlorohydrin copolymer

DOW CORNING(R) PI-2000 HIGHLY CONDUCTIVE SILVER INK**16. OTHER INFORMATION**

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark