

SAFETY DATA SHEET



Product: Electrically Conductive Silver Adhesive

Version: 1.0

Date of Issue: February 10, 2022

(1) IDENTIFICATION OF THE PRODUCT AND THE MANUFACTURER

Product Name: Electrically Conductive Silver Adhesive

Formula: Silver, vinyl acetate in methanol, acetic acid

Synonyms: Conductive Silver Adhesive, Conductive Silver Paint, Silver-filled Adhesive

Use: Electrically conductive adhesive for electrical connection of components, EMI shielding and manufacturing of flexible circuits.

Manufacturer: NanoView Nanotecnologia LTDA
CNPJ: 37.517.511/0001-95
Belo Horizonte – MG - Brazil
contato@nanoviewnanotecnologia.com

(2) HAZARD(S) IDENTIFICATION

GHS Categories

		Category	Signal Word	Pictogram
Sensitization	Skin	1	Warning	Exclamation
Eye Irritation		2	Warning	Exclamation
Skin Irritation		2	Warning	Exclamation
Hazardous to the Aquatic Environment	Chronic	1	Warning	Environment
Hazardous to the Aquatic Environment	Acute	1	Warning	Environment

Note: The degree of severity is ranked within each hazard class from 1 (Highest Severity) to up to 5 (Lowest Severity), which is opposite to HMIS and NFPA conventions. Severity category rankings do not allow comparisons between classes.

Signal Word: WARNING

Pictograms	Hazard Statements
	H317: May cause an allergic skin reaction H319: Causes serious eye irritation H315: Causes skin irritation


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	H410: Very toxic to aquatic life with long lasting effects
Prevention	Precautionary Statements
P102	Keep out of reach of children.
P261	Avoid breathing fumes/vapors.
P280	Wear protective gloves/eye protection.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P264	Wash hands thoroughly after handling.

Precautionary Statements

IF ON SKIN: Wash with plenty of water.

If skin irritation or rash occurs: Get medical advice/attention.

Take off contaminated clothing and wash it before reuse.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

Collect spillage.

Disposal

Dispose of contents/container in accordance to local/regional/international regulations.

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(3) COMPOSITION/INFORMATION ON INGREDIENTS

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>	<u>% WEIGHT</u>	<u>EC NUMBER</u>
Silver	7440-22-4	50%	231-131-3
Vinyl Acetate	108-05-4	7,5%	203-545-4
Methanol	67-56-1	17,5%	200-659-6
Acetic Acid	64-19-7	25%	200-580-7

(4) FIRST-AID MEASURES

Exposure Condition

Symptoms/Precautionary Statements

IF ON SKIN

Immediate Symptoms: redness, irritation, allergic dermatitis, rash.
Response: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.

IF IN EYES

Immediate Symptoms: redness, irritation.
Response: Rinse cautiously with water for at least 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

IF INHALED

Immediate Symptoms: low toxicity: cough, irritation of the respiratory track, sore throat, asthma.
Response: Remove person to fresh air and keep comfortable for breathing.

IF SWALLOWED

Immediate Symptoms: low toxicity: abdominal discomfort, nausea, vomiting.
Response: Rinse mouth. Do NOT induce vomiting.

(5) FIREFIGHTING MEASURES

Extinguishing Media: In case of fire: Use extinguishing media suitable for surrounding materials.

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Specific Hazards: Not flammable or combustible but burns if involved in a fire. Produces irritating smoke of unknown toxicity in fires. Inhalation of silver oxide fumes may cause metal fever and irritate the respiratory tract. The flu-like symptoms of metal fever may be delayed, occurring 4 to 12 hours after exposure. Prevent fire-fighting wash from entering waterway or sewer system.

Combustion Products: Produces carbon oxides (CO, CO₂), and toxic metal fumes.

Fire-Fighter: Wear self-contained breathing apparatus and full fire-fighting turn-out gear.

(6) ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders: If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

6.2 Environmental precautions

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

6.3 Methods and material for containment and cleaning up

Move containers from spill area. Avoid dust generation. Using a vacuum with HEPA filter will reduce dust dispersal. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

(7) HANDLING AND STORAGE

Protective measures: Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid release to the environment. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

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Conditions for safe storage, including any incompatibilities: Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use.

(8) EXPOSURE CONTROLS/PERSONAL PROTECTION

Long term exposure limit

Silver (metal dust, mist):

ACGIH: 0.1 mg/m³

U.S.A. OSHA PEL: 0.01 mg/m³

Ventilation

Keep airborne concentrations below the occupational exposure limits (OEL). The silver flakes are inextricably bound to the adhesive mixture; therefore, they are not available as airborne hazards under normal use. Ensure adequate ventilation if the product is mechanically aerosolized.

Eye protection

Wear appropriate protective eyeglasses or chemical safety goggles. RECOMMENDATION: Ensure that glasses have side shields for lateral protection.

Skin Protection

For likely contacts, use of protective butyl rubber, latex, neoprene, or other chemically resistant gloves. For incidental contacts, use nitrile or other chemically resistant gloves.

Respiratory Protection

If exposed to fumes or dust above the exposure limit, wear a suitable respirator meeting local, regional, and national guidelines. If the product is heated or the worker has a known allergic reaction, consider using a full mask with organic vapor cartridge or with an independent air supply. RECOMMENDATION: Consult your local safety supply store to ensure that your respirator has a NIOSH (U.S.) approved filter cartridges appropriate for the ingredients listed in Section 3. The respirator should be fitted to the employee by a professional.

(9) PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid, past

Appearance: Gray

Odor: Acidic

Odor Threshold: Not available

pH: 4

Freezing/Melting Point: Not available

Initial Boiling Point: Not available

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Flash Point: >180 °C

Evaporation Rate: Not available

Flammability: Not flammable

Lower Flammability Limit: Not available

Upper Flammability Limit: Not available

Vapor Pressure @20 °C: Not available

Vapor Density: Not available

Relative Density @25 °C: 2.1

Solubility in Water: Insoluble

Partition Coefficient n-octanol/water: Not available

Auto-ignition Temperature: Not available

Decomposition Temperature: Not available

Viscosity @25 °C: > 10 Pa.s

(10) STABILITY AND REACTIVITY

Reactivity: Reacts exothermically with amines.

Chemical Stability: Chemically stable at normal temperatures and pressures

Conditions to Avoid: Avoid ignition sources, open flames, and incompatible substances. Do not use in a way that aerosolizes the product.

Incompatibilities: Avoid strong oxidizing agents, strong acids, and strong bases.

Polymerization: Will not occur Decomposition. Will not decompose under normal conditions.

(11) TOXICOLOGICAL INFORMATION

Summary of Effects and Symptoms by Routes of Exposure

Eyes: Cause redness and irritation.

Skin: Cause skin redness, irritation, or allergic contact dermatitis.

Inhalation: May cause cough, respiratory irritation, sore throat, or asthma.

Ingestion: It may cause abdominal discomfort, nausea, vomiting (see inhalation symptoms).

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Chronic: Prolonged and repeated exposure may lead to skin sensitization. Prolonged and repeated ingestion or inhalation of silver may yield to an irreversible blue-grey discoloration of the skin.

Acute Toxicity (Lethal Exposure Concentrations)

<i>Chemical Name</i>	<i>Oral LD50</i>	<i>Species</i>	<i>Dermal LD50</i>	<i>Species</i>
<i>Silver</i>	> 5 g/kg	Guinea Pig	≥ 2 000 mg/kg	Rabbit
<i>Vinyl acetate</i>	2.900 mg/kg	Rat	7.440 mg/kg	Rabbit
<i>Methanol</i>	5628 mg/kg	Rat	15800 mg/kg.	Rabbit
<i>Acetic Acid</i>	3310 mg/kg	Rat	1060 mg/kg	Rabbit

(12) ECOLOGICAL INFORMATION

Contains silver particles of less than a 1 mm but more than 100 nm (larger than nanoparticles), which release ionic silver levels that is very toxic to the environment. While massive silver is insoluble in water, its powders is considered sufficiently soluble to give rise to an ecological hazard by EU regulators. The classification that follows takes into account to chronic aqueous toxicity of category 1 (M = 10 for silver) of the EU.

Acute Ecotoxicity: Category 1 - very toxic to aquatic life

Chronic Ecotoxicity: Category 1 - Very toxic to aquatic life with long lasting effects. Avoid release to the environment. Collect spillage.

Biodegradability: Not readily biodegradable

Bioaccumulation: Not available

Other Effects: Not available

(13) DISPOSAL INFORMATION

Dispose of container and unused contents in accordance with federal, state and local requirements.

(14) TRANSPORT INFORMATION

- (a) UN Number UN3077
- (b) UN proper shipping name Environmentally Hazardous Substance, Solid, N.O.S (Contains Silver)
- (c) Transport hazard class 9
- (d) Packing group III

(15) REGULATORY INFORMATION

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HMIS® RATING

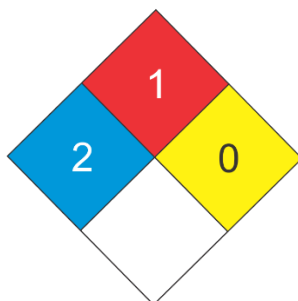
Health: 2

Flammability: 1

Physical Hazard: 0



NFPA® 704 CODES



HMIS and NFPA Risk Ratings Legend:

0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

RoHS (Restriction of Hazardous Substances Directive)

This product does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's, PBDE's, DEHP, BBP, DBP, or DIBP and complies with European RoHS regulations.

(16) OTHER INFORMATION

The information contained in this safety data sheet reflects our knowledge of the proper handling of this product and was compiled from reliable sources. It is the responsibility of the user to query and verify any information seeming suspect where doubt on the validity may exist. The buyer assumes all responsibility of using and handling the product in accordance with local, regional, national, and international regulations.

Abbreviations:

ACGIH American Conference of Governmental Industrial Hygienists (USA)
GHS Globally Harmonized System of Classification and Labeling of Chemicals
LD50 Lethal Dose 50%
OEL Occupational Exposure Limit
PEL Permissible Exposure Limit
SDS Safety Data Sheet