

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 10.03.2020

Version number 2

Revision: 10.03.2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

- **1.1 Product identifier**
- **Trade name:** *WB-101 Water-Based Silver Conductive Ink*
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
- **Sector of Use** *SU16 Manufacture of computer, electronic and optical products, electrical equipment*
- **Application of the substance / the mixture** *Film coating*
- **1.3 Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Kayaku Advanced Materials, Inc.
200 Flanders Road
Westborough, MA 01581
Tel: (617) 965-5511
Fax: (617) 965-5818
- **Further information obtainable from:**
Product Safety
Email: productsafety@kayakuAM.com
- **1.4 Emergency telephone number:**
Kayaku Advanced Materials : 617-965-5511
Chemtrec USA Emergency : 800-424-9300 (24 hr)
Chemtrec International Emergency : 703-527-3887 (24 hr)

SECTION 2: Hazards identification

- **2.1 Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**



GHS08 health hazard

Repr. 1B H360 May damage fertility or the unborn child.



GHS09 environment

Aquatic Acute 1 H400 Very toxic to aquatic life.

Aquatic Chronic 1 H410 Very toxic to aquatic life with long lasting effects.



GHS07

Skin Irrit. 2 H315 Causes skin irritation.

Eye Irrit. 2 H319 Causes serious eye irritation.

Skin Sens. 1 H317 May cause an allergic skin reaction.

- **2.2 Label elements**
- **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

(Contd. on page 2)

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 10.03.2020

Version number 2

Revision: 10.03.2020

Trade name: WB-101 Water-Based Silver Conductive Ink

(Contd. of page 1)

· Hazard pictograms



GHS07 GHS08 GHS09

· Signal word Danger

· Hazard-determining components of labelling:

Urethane acrylate oligomer

N-methyl-2-pyrrolidinone

· Hazard statements

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H317 May cause an allergic skin reaction.

H360 May damage fertility or the unborn child.

H410 Very toxic to aquatic life with long lasting effects.

· Precautionary statements

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.

P302+P352 IF ON SKIN: Wash with plenty of soap and water.

P304+P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P333+P313 If skin irritation or rash occurs: Get medical advice/attention.

P337+P313 If eye irritation persists: Get medical advice/attention.

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· Additional information:

Restricted to professional users.

· 2.3 Other hazards

· Results of PBT and vPvB assessment

 · **PBT:** Not applicable.


 · **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· 3.2 Chemical characterisation: Mixtures

 · **Description:** Mixture of substances listed below with nonhazardous additions.

· Dangerous components:

| | | |
|-------------------|--|--------|
| CAS: 7440-22-4 | Silver | 60-80% |
| EINECS: 231-131-3 |  Aquatic Acute 1, H400; Aquatic Chronic 1, H410 | |

(Contd. on page 3)

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 10.03.2020

Version number 2

Revision: 10.03.2020

Trade name: WB-101 Water-Based Silver Conductive Ink

(Contd. of page 2)

| | | |
|--|---|---|
| | Urethane acrylate oligomer | 5-15% |
| | ⚠ Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1B, H317 | |
| CAS: 872-50-4 EINECS: 212-828-1 Index number: 606-021-00-7 | N-methyl-2-pyrrolidinone | 1-5% |
| | ⚠ Acute Tox. 3, H331; ⚠ Repr. 1B, H360D; ⚠ Skin Irrit. 2, H315; Eye Irrit. 2, H319; STOT SE 3, H335 | |
| Additional Components: | | |
| CAS: 7732-18-5 EINECS: 231-791-2 | Water | 10-25% |
| CAS: 577-11-7 EINECS: 209-406-4 | Dioctyl sodium sulfosuccinate | ⚠ Acute Tox. 4, H302; Eye Irrit. 2, H319 <1% |
| SVHC | | |
| 872-50-4 | N-methyl-2-pyrrolidinone | |

Additional information: For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

- **4.1 Description of first aid measures**
- **General information:** Immediately remove any clothing soiled by the product.
- **After inhalation:**
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:**
Wash eyes immediately with a large amount of water or normal saline, occasionally lifting upper and lower eye lids until no evidence of chemical remains (about 20 minutes). Remove contact lenses if present and easy to remove. Seek immediate medical attention.
- **After swallowing:** If symptoms persist consult doctor.
- **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **4.3 Indication of any immediate medical attention and special treatment needed** Treat symptomatically.

SECTION 5: Firefighting measures

- **5.1 Extinguishing media**
- **Suitable extinguishing agents:**
Alcohol resistant foam
Fire-extinguishing powder
ABC powder
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **5.2 Special hazards arising from the substance or mixture** No further relevant information available.
- **5.3 Advice for firefighters**
- **Protective equipment:** Wear self-contained respiratory protective device.

SECTION 6: Accidental release measures

- **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation

(Contd. on page 4)

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 10.03.2020

Version number 2

Revision: 10.03.2020

Trade name: WB-101 Water-Based Silver Conductive Ink

(Contd. of page 3)

- **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **6.3 Methods and material for containment and cleaning up:**
 Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
 Ensure adequate ventilation.
- **6.4 Reference to other sections**
 See Section 7 for information on safe handling.
 See Section 8 for information on personal protection equipment.
 See Section 13 for disposal information.

SECTION 7: Handling and storage

- **7.1 Precautions for safe handling**
 Ensure good ventilation/exhaust at the workplace.
 Prevent formation of aerosols.
- **Information about fire - and explosion protection:**
 Protect against electrostatic charges.
 Keep ignition sources away - Do not smoke.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and containers:** No special requirements.
- **Information about storage in one common storage facility:**
 Do not store together with alkalis (caustic solutions).
 Do not store together with oxidising and acidic materials.
- **Further information about storage conditions:**
 Store in cool, dry conditions in well sealed containers.
 Protect from heat and direct sunlight.
 Store receptacle in a well ventilated area.
- **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.

· 8.1 Control parameters

- **Ingredients with limit values that require monitoring at the workplace:**

872-50-4 N-methyl-2-pyrrolidinone

| | |
|-------|---|
| IOELV | Short-term value: 80 mg/m ³ , 20 ppm |
| | Long-term value: 40 mg/m ³ , 10 ppm |
| | Skin |

- **Additional information:** The lists valid during the making were used as basis.

· 8.2 Exposure controls

- **Personal protective equipment:**

- **General protective and hygienic measures:**

Immediately remove all soiled and contaminated clothing
 Wash hands before breaks and at the end of work.

- **Respiratory protection:**

In case of low exposure use cartridge respirator. In case of intensive or longer exposure use self-contained respiratory protective device.

(Contd. on page 5)

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 10.03.2020

Version number 2

Revision: 10.03.2020

Trade name: WB-101 Water-Based Silver Conductive Ink

(Contd. of page 4)

· Protection of hands:


Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

· Material of gloves Nitrile rubber, NBR

· Penetration time of glove material

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· Eye protection:


Tightly sealed goggles

SECTION 9: Physical and chemical properties

· 9.1 Information on basic physical and chemical properties
· General Information
· Appearance:

| | |
|---------------------------|-----------------|
| Form: | Liquid |
| Colour: | Silver-coloured |
| · Odour: | Characteristic |
| · Odour threshold: | Not determined. |

| | |
|--------------------|-----------------|
| · pH-value: | Not determined. |
|--------------------|-----------------|

· Change in condition

| | |
|---|---------------|
| Melting point/freezing point: | Undetermined. |
| Initial boiling point and boiling range: | Undetermined. |

| | |
|-----------------------|-------|
| · Flash point: | 94 °C |
|-----------------------|-------|

| | |
|-------------------------------------|-----------------|
| · Flammability (solid, gas): | Not applicable. |
|-------------------------------------|-----------------|

| | |
|-------------------------------------|-----------------|
| · Decomposition temperature: | Not determined. |
|-------------------------------------|-----------------|

| | |
|-------------------------------------|------------------------------|
| · Auto-ignition temperature: | Product is not selfigniting. |
|-------------------------------------|------------------------------|

| | |
|--------------------------------|---|
| · Explosive properties: | Product does not present an explosion hazard. |
|--------------------------------|---|

· Explosion limits:

| | |
|---------------|-----------------|
| Lower: | Not determined. |
| Upper: | Not determined. |

| | |
|---------------------------|-----------------|
| · Vapour pressure: | Not determined. |
|---------------------------|-----------------|

| | |
|-------------------|-----------------|
| · Density: | Not determined. |
|-------------------|-----------------|

| | |
|---------------------------|-----------------|
| · Relative density | Not determined. |
|---------------------------|-----------------|

| | |
|-------------------------|-----------------|
| · Vapour density | Not determined. |
|-------------------------|-----------------|

| | |
|---------------------------|-----------------|
| · Evaporation rate | Not determined. |
|---------------------------|-----------------|

(Contd. on page 6)

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 10.03.2020

Version number 2

Revision: 10.03.2020

Trade name: WB-101 Water-Based Silver Conductive Ink

(Contd. of page 5)

| | |
|--|--|
| · Solubility in / Miscibility with water: | Not miscible or difficult to mix. |
| · Partition coefficient: n-octanol/water: | Not determined. |
| · Viscosity: | |
| Dynamic: | Not determined. |
| Kinematic: | Not determined. |
| · Solvent content: | |
| Organic solvents: | 1 - 5 % |
| Water: | 10 - 25 % |
| · Solids content: | 78 - 82 % |
| · 9.2 Other information | No further relevant information available. |

SECTION 10: Stability and reactivity

- **10.1 Reactivity** No further relevant information available.
- **10.2 Chemical stability** Stable
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **10.3 Possibility of hazardous reactions** No dangerous reactions known.
- **10.4 Conditions to avoid**
Heat, flames and sparks. Extremes of temperature and direct sunlight.
Contact with incompatible materials.
- **10.5 Incompatible materials:** Strong Oxidizing Agents, Strong Acids, Strong Bases
- **10.6 Hazardous decomposition products:** Carbon monoxide and carbon dioxide

SECTION 11: Toxicological information

- **11.1 Information on toxicological effects**
- **Acute toxicity** Based on available data, the classification criteria are not met.

· LD/LC50 values relevant for classification:

872-50-4 N-methyl-2-pyrrolidinone

| | | |
|------------|----------|---------------------|
| Oral | LD50 | 3914 mg/kg (Rat) |
| Dermal | LD50 | 8000 mg/kg (rabbit) |
| Inhalative | LC50/4 h | >5.0 mg/l (Rat) |

- **Primary irritant effect:**
- **Skin corrosion/irritation**
May cause skin irritation.
Causes skin irritation.
- **Serious eye damage/irritation**
Causes serious eye irritation.
- **Respiratory or skin sensitisation**
May cause an allergic skin reaction.
- **CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)**
- **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
- **Carcinogenicity** Based on available data, the classification criteria are not met.

(Contd. on page 7)

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 10.03.2020

Version number 2

Revision: 10.03.2020

Trade name: WB-101 Water-Based Silver Conductive Ink

(Contd. of page 6)

- **Reproductive toxicity**
May damage fertility or the unborn child.
- **STOT-single exposure** Based on available data, the classification criteria are not met.
- **STOT-repeated exposure** Based on available data, the classification criteria are not met.
- **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· 12.1 Toxicity

· Aquatic toxicity:

7440-22-4 Silver

| | |
|--------------------|--|
| LC50/96 h (static) | 0.0062 mg/l (<i>Lepomis macrochirus</i> (Bluegill)) |
| | 0.00155-0.00293 mg/l (<i>Pimephales promelas</i>) |

- **12.2 Persistence and degradability** No further relevant information available.
- **12.3 Bioaccumulative potential** No further relevant information available.
- **12.4 Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
- **12.5 Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

- **13.1 Waste treatment methods**
- **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Disposal must be made in accordance with International, National, and regional regulations.
- **Uncleaned packaging:**
- **Recommendation:** Disposal must be made according to official regulations.

SECTION 14: Transport information

- | | |
|---|--|
| <ul style="list-style-type: none"> · 14.1 UN-Number · ADR, IMDG, IATA | UN3082 |
| <ul style="list-style-type: none"> · 14.2 UN proper shipping name · ADR · IMDG · IATA | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Silver) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Silver), MARINE POLLUTANT Environmentally hazardous substance, liquid, n.o.s. (Silver) |

(Contd. on page 8)

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 10.03.2020

Version number 2

Revision: 10.03.2020

Trade name: WB-101 Water-Based Silver Conductive Ink

(Contd. of page 7)

· 14.3 Transport hazard class(es)
· ADR, IMDG, IATA

· Class

9 Miscellaneous dangerous substances and articles.

· Label

9

· 14.4 Packing group
· ADR, IMDG, IATA

III

· 14.5 Environmental hazards:

Product contains environmentally hazardous substances: Silver

· 14.6 Special precautions for user

Warning: Miscellaneous dangerous substances and articles.

· Hazard identification number (Kemler code):

90

· EMS Number:

F-A,S-F

· Stowage Category

A

· 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable.

· Transport/Additional information:
· ADR
· Limited quantities (LQ)

5L

· Excepted quantities (EQ)

Code: E1

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 1000 ml

· Transport category

3

· Tunnel restriction code

E

· IMDG
· Limited quantities (LQ)

5L

· Excepted quantities (EQ)

Code: E1

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 1000 ml

· UN "Model Regulation":

UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (SILVER), 9, III

SECTION 15: Regulatory information

· 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
· Directive 2012/18/EU
· Named dangerous substances - ANNEX I None of the ingredients is listed.

· Seveso category E1 Hazardous to the Aquatic Environment

· Qualifying quantity (tonnes) for the application of lower-tier requirements 100 t

· Qualifying quantity (tonnes) for the application of upper-tier requirements 200 t

· REGULATION (EC) No 1907/2006 ANNEX XVII Conditions of restriction: 3, 30, 71, 72

(Contd. on page 9)

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 10.03.2020

Version number 2

Revision: 10.03.2020

Trade name: WB-101 Water-Based Silver Conductive Ink

(Contd. of page 8)

· **National regulations:**

· **Other regulations, limitations and prohibitive regulations**

Kayaku Advanced Materials has confirmed with our precious metal suppliers that they do not use conflict minerals, as outlined in the Dodd-Frank Wall Street Reform and Consumer Protection Act in Title XV, Section 1502.

· **Substances of very high concern (SVHC) according to REACH, Article 57**

| | |
|----------|--------------------------|
| 872-50-4 | N-methyl-2-pyrrolidinone |
|----------|--------------------------|

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Relevant phrases**

H302 Harmful if swallowed.
 H315 Causes skin irritation.
 H317 May cause an allergic skin reaction.
 H319 Causes serious eye irritation.
 H331 Toxic if inhaled.
 H335 May cause respiratory irritation.
 H360D May damage the unborn child.
 H400 Very toxic to aquatic life.
 H410 Very toxic to aquatic life with long lasting effects.

· **Department issuing SDS:** Product safety department

· **Contact:** Tom Cole, EHS Manager (tcole@kayakuAM.com)

· **Revision History:** The manufacturer information in Section 1 has been updated.

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
 IMDG: International Maritime Code for Dangerous Goods
 IATA: International Air Transport Association
 GHS: Globally Harmonised System of Classification and Labelling of Chemicals
 EINECS: European Inventory of Existing Commercial Chemical Substances
 ELINCS: European List of Notified Chemical Substances
 CAS: Chemical Abstracts Service (division of the American Chemical Society)
 LC50: Lethal concentration, 50 percent
 LD50: Lethal dose, 50 percent
 PBT: Persistent, Bioaccumulative and Toxic
 SVHC: Substances of Very High Concern
 vPvB: very Persistent and very Bioaccumulative
 Acute Tox. 3: Acute toxicity - inhalation – Category 3
 Skin Irrit. 2: Skin corrosion/irritation – Category 2
 Eye Irrit. 2: Serious eye damage/eye irritation – Category 2
 Skin Sens. 1: Skin sensitisation – Category 1
 Skin Sens. 1B: Skin sensitisation – Category 1B
 Repr. 1B: Reproductive toxicity – Category 1B
 Repr. 1B: Reproductive toxicity – Category 1B
 STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
 Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
 Aquatic Chronic 1: Hazardous to the aquatic environment - long-term aquatic hazard – Category 1