

## Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 09.03.2020

Version number 2

Revision: 09.03.2020

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

- **1.1 Product identifier**
- **Trade name:** *AG-919 Heat Stable Silver 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** *Functional electronic screen printing ink*
- **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**



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.*

- **Hazard pictograms**



GHS07



GHS09

- **Signal word** *Warning*

(Contd. on page 2)

## Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 09.03.2020

Version number 2

Revision: 09.03.2020

**Trade name: AG-919 Heat Stable Silver Ink**

(Contd. of page 1)

· **Hazard-determining components of labelling:**

Proprietary Resin

· **Hazard statements**

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H317 May cause an allergic skin reaction.

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.

· **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 EINECS: 231-131-3	Silver ⚠ Aquatic Acute 1, H400; Aquatic Chronic 1, H410	40-60%
CAS: 112-15-2 EINECS: 203-940-1	Diethylene glycol monoethyl ether acetate ⚠ Eye Irrit. 2, H319	25-50%
	Proprietary Resin ⚠ Aquatic Chronic 2, H411; ⚠ Acute Tox. 4, H312; Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1, H317	5-15%

· **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.

(Contd. on page 3)

## Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 09.03.2020

Version number 2

Revision: 09.03.2020

**Trade name: AG-919 Heat Stable Silver Ink**

(Contd. of page 2)

- **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
- **6.2 Environmental precautions:**  
Inform respective authorities in case of seepage into water course or sewage system.  
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:**  
Keep ignition sources away - Do not smoke.  
Protect against electrostatic charges.  
No special measures required.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and containers:** No special requirements.

(Contd. on page 4)

## Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 09.03.2020

Version number 2

Revision: 09.03.2020

**Trade name: AG-919 Heat Stable Silver Ink**

(Contd. of page 3)

- **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:**  
 The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
- **Additional information:** The lists valid during the making were used as basis.
- **8.2 Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**  
 Keep away from food and beverages.  
 Immediately remove all soiled and contaminated clothing  
 Wash hands before breaks and at the end of work.  
 Avoid contact with the eyes and skin.
- **Respiratory protection:**  
 In case of low exposure use cartridge respirator. In case of intensive or longer exposure use self-contained respiratory protective device.
- **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

EU

(Contd. on page 5)

## Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 09.03.2020

Version number 2

Revision: 09.03.2020

Trade name: AG-919 Heat Stable Silver Ink

(Contd. of page 4)

### SECTION 9: Physical and chemical properties

#### · 9.1 Information on basic physical and chemical properties

##### · General Information

##### · Appearance:

Form:	Liquid
Colour:	Silver-coloured
Odour:	Sweetish
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: 98 °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.

· 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: 0.0 %

Solids content: 66 - 70 %

· 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.

(Contd. on page 6)

## Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 09.03.2020

Version number 2

Revision: 09.03.2020

**Trade name: AG-919 Heat Stable Silver Ink**

(Contd. of page 5)

- **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:**
- |                          |      |                   |
|--------------------------|------|-------------------|
| <b>Proprietary Resin</b> |      |                   |
| Oral                     | LD50 | 30000 mg/kg (Rat) |
| Dermal                   | LD50 | >1200 mg/kg (Rat) |
- **Primary irritant effect:**
  - **Skin corrosion/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.
  - **Reproductive toxicity** Based on available data, the classification criteria are not met.
  - **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:**
- |                         |   |
|-------------------------|---|
| <b>7440-22-4 Silver</b> |   |
| LC50/96 h (static)      | 0.0062 mg/l ( <i>Lepomis macrochirus</i> (Bluegill))<br>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.
  - **Ecotoxicological effects:**
  - **Remark:** Harmful to fish
  - **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.  
Harmful to aquatic organisms

(Contd. on page 7)



## Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 09.03.2020

Version number 2

Revision: 09.03.2020

**Trade name: AG-919 Heat Stable Silver Ink**


(Contd. of page 6)

- **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

- |  |  |
|--|--|
| · <b>14.1 UN-Number</b>  | UN3082   |
| · <b>ADR, IMDG, IATA</b>   |  |
| · <b>14.2 UN proper shipping name</b>  | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Silver, 4,4'-Isopropylidenediphenol- Epichlorohydrin Copolymer)                   |
| · <b>ADR, IATA</b>   |  |
| · <b>IMDG</b>  | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Silver, 4,4'-Isopropylidenediphenol- Epichlorohydrin Copolymer), MARINE POLLUTANT |
| · <b>14.3 Transport hazard class(es)</b>   |  |
| · <b>ADR, IMDG, IATA</b>   |  |
|  |   |
| · <b>Class</b>   | 9 Miscellaneous dangerous substances and articles.   |
| · <b>Label</b>   | 9  |
| · <b>14.4 Packing group</b>  | III  |
| · <b>ADR, IMDG, IATA</b>   |  |
| · <b>14.5 Environmental hazards:</b>   | Product contains environmentally hazardous substances: Silver  |
| · <b>14.6 Special precautions for user</b>                                       | Warning: Miscellaneous dangerous substances and articles.  |
| · <b>Hazard identification number (Kemler code):</b>                             | 90   |
| · <b>EMS Number:</b>   | F-A,S-F  |
| · <b>Stowage Category</b>  | A  |
| · <b>14.7 Transport in bulk according to Annex II of Marpol and the IBC Code</b> | Not applicable.  |

(Contd. on page 8)

## Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 09.03.2020

Version number 2

Revision: 09.03.2020

**Trade name: AG-919 Heat Stable Silver Ink**

(Contd. of page 7)

**· 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, 4,4'-  
 ISOPROPYLIDENEDIPHENOL- EPICHLOROHYDRIN  
 COPOLYMER), 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

**· 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.

**· 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**

H312 Harmful in contact with skin.

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H319 Causes serious eye irritation.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

H411 Toxic to aquatic life with long lasting effects.

(Contd. on page 9)



**Safety data sheet**  
**according to 1907/2006/EC, Article 31**

Printing date 09.03.2020

Version number 2

Revision: 09.03.2020

**Trade name: AG-919 Heat Stable Silver Ink**

(Contd. of page 8)

**· Classification according to Regulation (EC) No 1272/2008***Art. 9(1) of Regulation (EC) No. 1272/2008 was used for classification purposes.***· 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**vPvB: very Persistent and very Bioaccumulative**Acute Tox. 4: Acute toxicity - dermal - Category 4**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**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**Aquatic Chronic 2: Hazardous to the aquatic environment - long-term aquatic hazard - Category 2*