

Printing date 02/12/2020

Reviewed on 02/12/2020

1 Identification

· **Product identifier**

· **Trade name:** XM-AG-3046 Silver Conductive Ink

· **Application of the substance / the mixture**

To be used by technically qualified personnel for research and development use only.

· **Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**

Applied Ink Solutions
200 Flanders Road
Westborough, MA 01581
USA

· **Information department:** sales@appliedinksolutions.com

· **Emergency telephone number:**

Applied Ink Solutions : 617-965-5511
Chemtrec USA Emergency : 800-424-9300 (24 hr)
Chemtrec International Emergency : 703-527-3887 (24 hr)

2 Hazard(s) identification

· **Classification of the substance or mixture**



GHS08 Health hazard

STOT SE 2 H371 May cause damage to organs.



GHS09 Environment

Aquatic Acute 1 H400 Very toxic to aquatic life.

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

Flam. Liq. 4 H227 Combustible liquid.

· **Label elements**

· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

· **Hazard pictograms**



GHS08 GHS09

· **Signal word** Warning

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

Proprietary Additive

· **Hazard statements**

H227 Combustible liquid.

H371 May cause damage to organs.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

· **Precautionary statements**

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

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- P260 Do not breathe dust/fume/gas/mist/vapors/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.
P302+P352 If on skin: Wash with plenty of soap and water.
P304+P341 If inhaled: If breathing is difficult, remove person to fresh air and keep 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.
P370+P378 In case of fire: Use to extinguish: Alcohol resistant foam, Fire-extinguishing powder, Carbon dioxide.
P403+P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Classification system:**

· **NFPA ratings (scale 0 - 4)**



· **HMIS-ratings (scale 0 - 4)**



· **Other hazards**

· **Results of PBT and vPvB assessment**

· **PBT:** Not applicable.


· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**

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

· **Dangerous components:**

7440-22-4	Silver	 Aquatic Acute 1, H400; Aquatic Chronic 1, H410	25-50%
106-65-0	Dimethyl succinate	Flam. Liq. 4, H227	5-15%
627-93-0	Dimethyl adipate	Aquatic Acute 3, H402	5-15%
	Proprietary Additive	 STOT SE 2, H371	1-5%

· **Additional Components:**

1119-40-0	Dimethyl glutarate	10-25%
	Polyurethane polymer	1-5%

4 First-aid measures

· **Description of first aid measures**

· **After inhalation:** Supply fresh air; consult doctor in case of complaints.

· **After skin contact:** Generally the product does not irritate the skin.

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· **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:**

Do not induce vomiting unless instructed to do so by a physician. Wash out mouth with water and keep person at rest. Seek immediate medical attention.

· **Information for doctor:**

· **Most important symptoms and effects, both acute and delayed** No further relevant information available.

· **Indication of any immediate medical attention and special treatment needed** Treat symptomatically.

5 Fire-fighting measures

· **Extinguishing media**

· **Suitable extinguishing agents:**

Alcohol resistant foam

Fire-extinguishing powder

Carbon dioxide

· **For safety reasons unsuitable extinguishing agents:** Water with full jet

· **Special hazards arising from the substance or mixture** No further relevant information available.

· **Advice for firefighters**

· **Protective equipment:** Wear SCBA.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**

Ensure adequate ventilation

Keep away from ignition sources

Wear protective equipment. Keep unprotected persons away.

· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.

· **Methods and material for containment and cleaning up:**

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

· **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.

· **Protective Action Criteria for Chemicals**

· **PAC-1:**

7440-22-4	Silver	0.3 mg/m ³
106-65-0	Dimethyl succinate	2.5 ppm
67-56-1	Methanol	530 ppm
108-05-4	vinyl acetate	6.7 ppm

· **PAC-2:**

7440-22-4	Silver	170 mg/m ³
106-65-0	Dimethyl succinate	28 ppm
67-56-1	Methanol	2,100 ppm
108-05-4	vinyl acetate	36 ppm

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· PAC-3:		
7440-22-4	Silver	990 mg/m ³
106-65-0	Dimethyl succinate	170 ppm
67-56-1	Methanol	7200* ppm
108-05-4	vinyl acetate	180 ppm

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
Ensure good ventilation/exhaust at the workplace.
Keep away from heat and direct sunlight.
- **Information about protection against explosions and fires:**
Protect against electrostatic charges.
Keep ignition sources away - Do not smoke.
- **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 oxidizing and acidic materials.
- **Further information about storage conditions:**
Keep container well-sealed in cool, dry location.
Protect from heat and direct sunlight.
Store receptacle in a well ventilated area.
- **Specific end use(s)** For Research and Development Use Only

8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.
- **Control parameters**
- **Components 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 that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:** Wash hands before breaks and at the end of work.
- **Respiratory equipment:** Not required.
- **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** Contact glove manufacture for break-through time.

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· **Eye protection:**

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Tightly sealed goggles

9 Physical and chemical properties

· **Information on basic physical and chemical properties**

· **General Information**

· **Appearance:**

Form: Thick liquid

Color: Silver-colored

· **Odor:** Mild

· **Odor threshold:** Not determined.

· **pH-value:** Not determined.

· **Change in condition**

Melting point/Melting range: Undetermined.

Boiling point/Boiling range: 96-103 °C (204.8-153.4 °F)

· **Flash point:** 90 °C (194 °F)

· **Flammability (solid, gaseous):** Not applicable.

· **Decomposition temperature:** Not determined.

· **Auto igniting:** Product is not selfigniting.

· **Danger of explosion:** Not determined.

· **Explosion limits:**

Lower: Not determined.

Upper: Not determined.

· **Vapor pressure at 20 °C (68 °F):** 8.3 hPa (6.2 mm Hg)

· **Density at 20 °C (68 °F):** 5.8076 g/cm³ (48.46442 lbs/gal)

· **Relative density** Not determined.

· **Vapor density** Not determined.

· **Evaporation rate** 1.6-2.3 (BuAc=1)

· **Solubility in / Miscibility with**

Water: Water miscible No

· **Partition coefficient (n-octanol/water):** Not determined.

· **Viscosity:**

Dynamic: Not determined.

Kinematic: Not determined.

· **Solvent content:**

Organic solvents: 0.1 %

VOC content: 0.05 %

Solids content: 59.9 %

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· **Other information**

No further relevant information available.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability** Stable
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** Contact with incompatible materials.
- **Incompatible materials:** Strong Oxidizing Agents, Strong Acids, Strong Bases
- **Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Nitrogen oxides (NOx)
Hydrogen chloride (HCl)

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
- **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**

108-05-4 vinyl acetate

2B

· **NTP (National Toxicology Program)**

None of the ingredients are listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients are listed.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.

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· **Other adverse effects** No further relevant information available.

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13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
Must not be disposed of as regular garbage/trash. Do not allow product to reach sewage system.
Disposal must be made in accordance with Federal, State, and Local regulations.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made in accordance with Federal, State, and Local regulations.

14 Transport information

· UN-Number	UN3082
· DOT, ADR, IMDG, IATA	
· UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (Silver)
· DOT	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID,
· ADR, IATA	N.O.S. (Silver)
· IMDG	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID,
	N.O.S. (Silver), MARINE POLLUTANT
· Transport hazard class(es)	
· DOT, ADR, IMDG, IATA	
	
· Class	9 Miscellaneous dangerous substances and articles
· Label	9
· Packing group	
· DOT, ADR, IMDG, IATA	III
· Environmental hazards:	Not applicable.
· Marine pollutant:	Yes (DOT)
· 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
· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
· Transport/Additional information:	
· DOT	
· Quantity limitations	On passenger aircraft/rail: No limit On cargo aircraft only: No limit

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· ADR	
· Excepted quantities (EQ)	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· 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

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **Sara**

- **Section 355 (extremely hazardous substances):**

108-05-4	vinyl acetate
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- **Section 313 (Specific toxic chemical listings):**

7440-22-4	Silver
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67-56-1	Methanol
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108-05-4	vinyl acetate
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- **TSCA (Toxic Substances Control Act):** All ingredients are listed or comply with TSCA regulations.

- **Hazardous Air Pollutants**

67-56-1	Methanol
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108-05-4	vinyl acetate
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- **Proposition 65**

- **Chemicals known to cause cancer:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients are listed.

- **Chemicals known to cause developmental toxicity:**

67-56-1	Methanol
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- **Carcinogenic categories**

- **EPA (Environmental Protection Agency)**

7440-22-4	Silver	D
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- **TLV (Threshold Limit Value established by ACGIH)**

108-05-4	vinyl acetate	A3
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- **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients are listed.

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· Massachusetts State Right To Know List	
7440-22-4	Silver
· New Jersey State Right To Know List	
7440-22-4	Silver
1119-40-0	Dimethyl glutarate
627-93-0	Dimethyl adipate
· Pennsylvania Hazardous Substances List	
7440-22-4	Silver
1119-40-0	Dimethyl glutarate
627-93-0	Dimethyl adipate

- **California SCAQMD Rule 443.1 VOC's:** No information available.
- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**



GHS08 GHS09

- **Signal word** Warning
- **Hazard-determining components of labeling:**
Proprietary Additive
- **Hazard statements**
H227 Combustible liquid.
H371 May cause damage to organs.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.
- **Precautionary statements**
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260 Do not breathe dust/fume/gas/mist/vapors/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.
P302+P352 If on skin: Wash with plenty of soap and water.
P304+P341 If inhaled: If breathing is difficult, remove person to fresh air and keep 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.
P370+P378 In case of fire: Use to extinguish: Alcohol resistant foam, Fire-extinguishing powder, Carbon dioxide.
P403+P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
- **National regulations:**
- **Other regulations, limitations and prohibitive regulations**
RoHS (EU)2015/863 along with EU Directive 2002/95/EC – Waste from Electrical and Electronic Equipment (WEEE):
Applied Ink Solutions products do not exceed the amount of allowable levels concerning: Cadmium (Cd); Mercury (Hg); Lead (Pb); Hexavalent chromium (Cr6+); Polybrominated biphenyls (PBB); Polybrominated

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diphenyl ethers (PBDE); Bis(2-Ethylhexyl) phthalate (DEHP); Benzyl butyl phthalate (BBP); Dibutyl phthalate (DBP); Diisobutyl phthalate (DIBP); Bis(2-Ethylhexyl) phthalate (DEHP); Benzyl butyl phthalate (BBP); Dibutyl phthalate (DBP); Diisobutyl phthalate (DIBP).

Applied Ink Solutions 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.

Registration, Evaluation and Authorization of Chemicals (REACH) & Substances of Very High Concern (SVHC):
This product does not contain substances on the SVHC list.

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

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.

- **Department issuing SDS:** Product safety department
- **Contact:** Tom Cole, EHS Manager (tcole@kayakuAM.com)

· **Revision History:** New SDS

· **Date of preparation / last revision** 02/12/2020 / -

· **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

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

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)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

Flam. Liq. 4: Flammable liquids – Category 4

STOT SE 2: Specific target organ toxicity (single exposure) – Category 2

Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1

Aquatic Acute 3: Hazardous to the aquatic environment - acute aquatic hazard – Category 3

Aquatic Chronic 1: Hazardous to the aquatic environment - long-term aquatic hazard – Category 1