

Printing date 03/14/2019

Reviewed on 03/14/2019

1 Identification

· **Product identifier**

· **Trade name:** *XM-AG-3045 Silver Conductive Ink*

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

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

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

· **Manufacturer/Supplier:**

Applied Ink Solutions
200 Flanders Road
Westborough, MA 01581
USA

· **Information department:**

Product Safety
Email: sales@appliedinksolutions.com

· **Emergency telephone number:**

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

2 Hazard(s) identification

· **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 3 H226 Flammable liquid and vapor.



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

STOT SE 3 H336 May cause drowsiness or dizziness.

Expl. 1.5 H205 May mass explode in fire.

· **Label elements**

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

· **Hazard pictograms**



GHS02



GHS07



GHS09

· **Signal word** *Danger*

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· Hazard-determining components of labeling:
n-Butyl acetate

· Hazard statements

H205 May mass explode in fire.

H226 Flammable liquid and vapor.

H336 May cause drowsiness or dizziness.

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.

P261 Avoid breathing 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+P340 IF INHALED: 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+P233 Store in a well-ventilated place. Keep container tightly closed.

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

· Classification system:
· NFPA ratings (scale 0 - 4)


Health = 0

Fire = 3

Reactivity = 4

· HMIS-ratings (scale 0 - 4)


HEALTH 0 Health = 0

FIRE 3 Fire = 3





REACTIVITY 4 Reactivity = 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	40-60%
123-86-4	<i>n</i> -Butyl acetate	 Flam. Liq. 3, H226;  STOT SE 3, H336	25-50%
112-34-5	Butyl carbitol	 Eye Irrit. 2A, H319	5-15%

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· Additional Components:

Proprietary polyester

5-15%

4 First-aid measures

· Description of first aid measures
· 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:

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

Wear protective equipment. Keep unprotected persons away.

Keep away from ignition sources

Ensure adequate ventilation

· 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).

Ensure adequate ventilation.

Do not flush with water or aqueous cleansing agents

· 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.

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· Protective Action Criteria for Chemicals**· PAC-1:**

7440-22-4	Silver	0.3 mg/m ³
123-86-4	n-Butyl acetate	5 ppm
112-34-5	Butyl carbitol	30 ppm

· PAC-2:

7440-22-4	Silver	170 mg/m ³
123-86-4	n-Butyl acetate	200 ppm
112-34-5	Butyl carbitol	33 ppm

· PAC-3:

7440-22-4	Silver	990 mg/m ³
123-86-4	n-Butyl acetate	3000* ppm
112-34-5	Butyl carbitol	200 ppm

7 Handling and storage**· Handling:****· Precautions for safe handling**

Ensure good ventilation/exhaust at the workplace.

Prevent formation of aerosols.

· Information about protection against explosions and fires:

Keep ignition sources away - Do not smoke.

Protect against electrostatic charges.

· 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) No further relevant information available.**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 following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit.

At this time, the remaining constituent has no known exposure limits.

123-86-4 n-Butyl acetatePEL Long-term value: 710 mg/m³, 150 ppm

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REL	Short-term value: 950 mg/m ³ , 200 ppm Long-term value: 710 mg/m ³ , 150 ppm
TLV	Short-term value: 712 mg/m ³ , 150 ppm Long-term value: 238 mg/m ³ , 50 ppm
112-34-5 Butyl carbitol	
TLV	Long-term value: 67.5* mg/m ³ , 10* ppm *Inhalable fraction and vapor

- **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:**
In case of low exposure, use cartridge respirator. In case of intensive or longer exposure, use SCBA.
- **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.
- **Eye protection:**



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:** Sweet
- **Odor threshold:** Not determined.
- **pH-value:** Not determined.
- **Change in condition**
 - Melting point/Melting range:** Undetermined.
 - Boiling point/Boiling range:** 124-128 °C (255.2-262.4 °F)
- **Flash point:** 27 °C (80.6 °F)
- **Flammability (solid, gaseous):** Not applicable.
- **Ignition temperature:** 225 °C (437 °F)
- **Decomposition temperature:** Not determined.

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· Auto igniting:	Product is not selfigniting.
· Danger of explosion:	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· Explosion limits:	
Lower:	1.2 Vol %
Upper:	7.5 Vol %
· Vapor pressure at 20 °C (68 °F):	10.7 hPa (8 mm Hg)
· Density at 20 °C (68 °F):	1.15864 g/cm ³ (9.66885 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:	39.2 %
VOC content:	39.20 %
Solids content:	60.8 %
· 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**
Heat, flames and sparks. Extremes of temperature and direct sunlight.
Contact with incompatible materials.
- **Incompatible materials:** Strong Oxidizing Agents, Strong Acids, Strong Bases
- **Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Hydrocarbons

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.

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· Additional toxicological information:
· Carcinogenic categories
· IARC (International Agency for Research on Cancer)

None of the ingredients are listed.

· 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:
7440-22-4 Silver

LC50/96 h (static) 0.0062 mg/l (*Lepomis macrochirus* (Bluegill))

0.00155-0.00293 mg/l (*Pimephales promelas*)

· 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.

· Other adverse effects No further relevant information available.

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
· DOT, ADR, IMDG, IATA

UN1210

· UN proper shipping name
· DOT

Printing ink

· ADR, IATA

PRINTING INK



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· IMDG	PRINTING INK (Silver), MARINE POLLUTANT
· Transport hazard class(es)	
· DOT	
	
· Class	3 Flammable liquids
· Label	3
· ADR, IMDG, IATA	
	
· Class	3 Flammable liquids
· Label	3
· Packing group	
· DOT, ADR, IMDG, IATA	III
· Environmental hazards:	Not applicable.
· Marine pollutant:	Yes (DOT)
· Special precautions for user	Warning: Flammable liquids
· Danger code (Kemler):	30
· EMS Number:	F-E,S-D
· 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: 60 L On cargo aircraft only: 220 L
· 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 1210 PRINTING INK, 3, III

US

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15 Regulatory information

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

· Section 355 (extremely hazardous substances):

None of the ingredients are listed.

· Section 313 (Specific toxic chemical listings):

7440-22-4 Silver

112-34-5 Butyl carbitol

· TSCA (Toxic Substances Control Act):

All ingredients are listed or comply with TSCA regulations.

· Hazardous Air Pollutants

None of the ingredients are listed.

· 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:

None of the ingredients are listed.

· Carcinogenic categories

· EPA (Environmental Protection Agency)

7440-22-4 Silver

D

· TLV (Threshold Limit Value established by ACGIH)

None of the ingredients are listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients are listed.

· Massachusetts State Right To Know List

7440-22-4 Silver

123-86-4 n-Butyl acetate

· New Jersey State Right To Know List

7440-22-4 Silver

123-86-4 n-Butyl acetate

· Pennsylvania Hazardous Substances List

7440-22-4 Silver

123-86-4 n-Butyl acetate

· 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).

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· Hazard pictograms


GHS02 GHS07 GHS09

· Signal word Danger
· Hazard-determining components of labeling:
n-Butyl acetate
· Hazard statements

H205 May mass explode in fire.

H226 Flammable liquid and vapor.

H336 May cause drowsiness or dizziness.

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.

P261 Avoid breathing 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+P340 IF INHALED: 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+P233 Store in a well-ventilated place. Keep container tightly closed.

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

· 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: Mr. Cole

· Revision History: New SDS

· Date of preparation / last revision 03/14/2019 / -

· 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)

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*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**Expl. 1.5: Explosives – Division 1.5**Flam. Liq. 3: Flammable liquids – Category 3**Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A**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*

US