

 VOLTERA	MATERIAL SAFETY DATA SHEET <i>according to EC 1907/2006 Article 31</i>	VERSION NO: 2
	CONDUCTOR	REVISION: 2017-11-13

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product name: Conductor
Synonyms: Conductive Ink, Conductive Paste, Silver Ink, Silver Conductor, Silver Paste
Supplier: Voltera Inc.
100-113 Breithaupt St.
Kitchener, ON, N2H5G9, Canada
support@voltera.io
Emergency: CANUTEC 1+ 613-996-6666
Intended use: Circuit board prototyping

SECTION 2: HAZARDS IDENTIFICATION

Classification of the substance or mixture

Aquatic Acute 1 H400 Very toxic to aquatic life
Aquatic Chronic 1 H410 Very toxic to aquatic life with long lasting effects
H227 Combustible liquid
Acute Tox. 5 H333 May be harmful if inhaled

Label Elements: GHS label elements

Hazard pictograms



GHS09

Signal word: Warning

Hazard-determining components of labeling: Phenol

Hazard statements

H227 Combustible liquid
H333 May be harmful if inhaled
H410 Very toxic to aquatic life with long lasting effects

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking
P273 Avoid release to the environment
P280 Wear protective gloves/protective clothing/eye protection/face protection
P304+P312 IF INHALED: Call a POISON CENTER or a doctor/physician if you feel unwell
P403+P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical characterization: Mixtures

Description: Mixture of substances listed below, with nonhazardous additions

Dangerous Components:

7440-22-4	Silver powder	75 – 100%
124-17-4	2-(2-butoxyethoxy)ethyl acetate	5 – 10%
55185-45-0	Formaldehyde, polymer with ammonia, 2-methylphenol and phenol	5 – 10%
32647-67-9	D-Glucitol, bis-O-(phenylmethylene)-	≤ 2,5%
872-50-4	N-methyl-2-pyrrolidone	≤ 0,5%
108-95-2	Phenol	≤ 0,5%

SECTION 4: FIRST AID MEASURES

Description of first aid measures

Inhalation: Supply fresh air; consult doctor in case of complaints.
Skin contact: Generally the product does not irritate the skin.
Eye contact: Rinse opened eye for several minutes under running water.
Swallowing: If symptoms persist consult a doctor.

No further relevant information available.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing agents: CO₂, powder or water spray. Fight larger fires with water spray or alcohol-resistant foam.

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

Advice for firefighters
Protection Equipment: No special measures required.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions: Wear protective clothing.

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.

Methods and material for containment and clean 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.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling: No special precautions are necessary if used correctly.

Information about fire and explosion protection: No special measures required

Conditions for safe storage, including any incompatibilities
Requirements to be met by storerooms and receptacles: Store only in original receptacle.
Information about storage in one common storage facility: Store away from foodstuffs.
Further information about storage conditions: Prevent from drying out.

Specific end uses: No further relevant information available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

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

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.

Exposure Controls
Personal protective equipment:
General protective and hygienic measures: Wash hands before breaks and at the end of work.
Respiratory protection: Use suitable respiratory protective device in case of insufficient ventilation. Filter A2B2P3.

Protection of hands:
Protective gloves: Only use chemical-protective gloves with CE-labelling of category III. Check protective gloves prior to each use for their proper condition. After use of gloves apply skin-cleaning agents and skin cosmetics
Material of gloves: The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
 For short use and minimal soiling we recommend disposable protective gloves made of special nitrile, e.g. Dermatrill from KCL.
 For longer use and stronger soiling we recommend 4H-Chemicals-Protective-Gloves from SETON.
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: Goggles recommended during refilling.

Body protection: Protective work clothing.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

General Information

<i>Appearance:</i>	Pasty, brown
<i>Odour:</i>	Strong
<i>Odour threshold:</i>	Not determined
<i>pH-value:</i>	Not determined

Change in condition

<i>Melting point/range:</i>	Undetermined
<i>Boiling point/range:</i>	245°C (calc)
<i>Flash point:</i>	90°C (calc)
<i>Flammability:</i>	Not applicable
<i>Ignition temperature:</i>	290°C (calc)
<i>Decomposition temperature:</i>	Not determined

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<i>Self-igniting:</i>	Not self igniting
<i>Danger of explosion:</i>	Product does not present an explosion hazard
<i>Explosion limits:</i>	Not determined
Vapour pressure:	Not determined
Density:	Not determined
<i>Relative Density:</i>	Not determined
<i>Vapour Density:</i>	Not determined
Evaporation rate:	Not determined
Solubility in/Miscibility with water:	Not miscible or difficult to mix
Partition coefficient (n-octanol/water):	Not determined
Viscosity	
<i>Dynamic at 20°C:</i>	> 200000 mPas
<i>Kinematic:</i>	Not determined
Solvent content	
<i>Organic solvnts:</i>	9,5%
<i>Water</i>	0,0%
Solids content	90,5%
Other information	No further relevant information available

SECTION 10: STABILITY AND REACTIVITY**Reactivity****Chemical Stability****Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications (<100°C)**Possibility of hazardous reactions:** No dangerous reactions known**Conditions to avoid:** No further relevant information available**Incompatible materials:** No further relevant information available**Hazardous decomposition products:** No dangerous decomposition products known**SECTION 11: TOXICOLOGICAL INFORMATION****Information on toxicological effects****Acute toxicity:****LD/LC50 values relevant for classification:****124-17-4 2-(2-butoxyethoxy)ethyl acetate**

<i>Oral</i>	<i>LD50</i>	6500 mg/kg (rat)
<i>Dermal</i>	<i>LD50</i>	5400-14500 mg/kg (rbt)
<i>Inhalative</i>	<i>LC50/4 h</i>	73,7 mg/l (rat)

872-50-4 N-methyl-2-pyrrolidone

<i>Oral</i>	<i>LD50</i>	3600 mg/kg (rat)
<i>Dermal</i>	<i>LD50</i>	8000 mg/kg (rabbit)

108-95-2 phenol

<i>Oral</i>	<i>LD50</i>	317 mg/kg (rat)
<i>Dermal</i>	<i>LD50</i>	650 mg/kg (rbt)

Primary irritant effect:

<i>On the skin:</i>	No irritating effect
<i>On the eye:</i>	No irritating effect

Sensitization: No sensitizing effects known.**SECTION 12: ECOLOGICAL INFORMATION****Toxicity****Aquatic Toxicity:****7440-22-4 Silver Powder**

<i>LC50/96h</i>	0,0102 mg/l (fish) (anguilla anguilla) (valid for particle size<1mm)
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124-17-4 2-(2-butoxyethoxy)ethyl acetate

<i>EC50/48h</i>	>100 mg/l (daphnia)
<i>LC50/96h</i>	10-100 mg/l (fish)

872-50-4 N-methyl-2-pyrrolidone

<i>EC50/72h</i>	>500 mg/l (algae)
<i>LC50/48h</i>	>9000 mg/l (bak)
<i>LC50/96h</i>	4000 mg/l (fish)

108-95-2 phenol

<i>EC50/48h</i>	23 mg/l (daphnia)
<i>LC50/96h</i>	8,9 mg/l (fish) (Oncorhynchus mykiss)

Persistence and degradability: No further relevant information available**Bioaccumulative potential:** No further relevant information available

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Mobility in soil: No further relevant information available

Ecotoxicological effects:

Remark: Very toxic for fish

Additional ecological information:

General notes: Water hazard class 2 (Gernam Regulation) (in accordance with VwBwS from 15.05.1999): 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.

Also poisonous for fish and plankton in water bodies

Very toxic for aquatic organisms

Results of PBT and vPvB assessment:

PBT: Not applicable

vPvB: Not applicable

Other adverse effects: No further relevant information available.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods

Recommendation: Must not be treated with household garbage. Do not allow product to reach sewage system. Contact manufacturer for recycling information.

Uncleaned packaging

Recommendation: Disposal must be made according to official regulations.

SECTION 14: TRANSPORT INFORMATION

UN-Number

ADR, IMDG, IATA

UN3082

UN proper shipping name

ADR:

IMDG:

3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S (Silver powder)
 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S (Silver powder), MARINE POLLUTANT
 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S (Silver powder)

IATA:

Transport hazard class(es)

ADR, IMDG, IATA



Class:

Label:

9, miscellaneous dangerous substances and articles
 9

Packing group

ADR, IMDG, IATA

III

Environmental hazards:

Marine pollutant:

Product contains environmentally hazardous substances: Silver powder
 Yes

Special marking (ADR)

Special marking (IATA):

Special precautions for user:

Danger code (Kemler):

EMS Number:

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Transport / Additional information

ADR

Limited quantities (LQ)

Transport category

Tunnel restriction code

5L

3

E

UN "Model Regulation":

3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S (Silver powder), 9 , III

SECTION 15: REGULATORY INFORMATION

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

Label Elements: GHS label elements

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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:

Technical instructions (air):

Class	Share in %
I	≤ 0,5
II	5 – 10
III	≤ 0,5

Other regulations, limitations and prohibitive regulations

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

872-50-4 N-methyl-2-pyrrolidone

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.

Contact: Matthew Ewertowski

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
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
(calc.): calculated
Acute Tox. 3: Acute toxicity, Hazard Category 3
Acute Tox. 5: Acute toxicity, Hazard Category 5
Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 2
Eye Irrit. 2: Serious eye damage / eye irritation, Hazard Category 2
Muta. 2: Germ cell mutagenicity, Hazard Category 2
Repr. 1B: Reproductive toxicity, Hazard Category 1B
STOT SE 3: Specific target organ toxicity – Single exposure, Hazard Category 3
STOT RE 2: Specific target organ toxicity – Repeated exposure, Hazard Category 2
Aquatic Acute 1: Hazardous to the aquatic environment – Acute Hazard, Category 1
Aquatic Chronic 1: Hazardous to the aquatic environment – Chronic Hazard, Category 1