



SAFETY DATA SHEET

This SDS complies with REACH 1907/2006 and 2001/58/EC, GHS REVISION 5, OSHA 29CFR 1910.1200

Section 1: Chemical Product and Company Identification

MANUFACTURER'S NAME

Voxel8
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EMERGENCY TELEPHONE

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Safety Data Sheet Competent Person: Stephanie Marzen

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DATE PREPARED: October 1, 2015

REVISION DATE: March 11, 2015

PRODUCT NAME: **Silver Conductive Ink - Standard**

FORMULA: Preparation/Mixture

PRODUCT USE: Silver conductive ink for 3D printable electronics

Section 2: Hazards Identification



GHS Hazard Class

Serious eye damage/irritation – Category 2B
Skin sensitization – Category 1
Reproductive Toxicity – Category 2
Specific Target Organ Toxicity – Repeated Exposure (eye) – Category 1
Danger

Signal word:

Hazard Statement:

H320: Causes eye irritation
H317: May cause an allergic skin reaction
H372: Causes damage to organs (eye) through prolonged or repeated exposure
H360: May damage fertility or the unborn child
Precautionary Statements: Prevention
P201: Obtain special instructions before use
P261: Avoid breathing dust/fumes/gas/mist/vapors/spray
P264: Wash hands thoroughly after handling
P270: Do not eat, drink or smoke when using this product
P281: Wear personal protective equipment as required
Response
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention
P302+P352: IF ON SKIN: wash with plenty of water
P333+P313: IF skin irritation or rash occurs: Get medical advice/attention
P362+P364: Take off contaminated clothing and wash before reuse
P314: Get medical advice/attention if you feel unwell
Storage
Disposal
P405: Store locked up
P501: Dispose of contents/container in accordance with waste disposal requirements of your country, state, or local authorities.

Precautionary Statements:

Prevention

Response

Storage

Disposal

Hazards not otherwise classified (HNOC) - None

HAZARD CLASSIFICATION:

Not classified as hazardous based on IATA, IMDG, and DOT.

FIRE AND EXPLOSION:

Not considered flammable or combustible, but this product will burn if involved in a fire. Product emits toxic fumes when burned.

POTENTIAL HEALTH EFFECTS:

<1 % of mixture consists of ingredients of unknown acute toxicity

APPEARANCE:

Silver – Metallic paste

NFPA Rating:



Component	Health (Blue)	Flammability (Red)	Reactivity (Yellow)	Special (White)
Silver Conductive Ink - Standard	2	0	1	-----

Section 3: Composition, Information on Ingredients

PRODUCT COMPOSITION	APPROX %	CAS NO.	EC NUMBER	CANADA DSL
Silver	<80	7440-22-4	231-131-3	Y
Cyclic amide	<15	872-50-4	212-828-1	Y
Alcohol ethoxylate, polymer	<2	68439-46-3	614-482-0	Y
Dipropylene glycol, monomethyl ether	<1	34590-94-8	252-104-2	Y

Some items on this SDS may be designated as trade secrets (TS). Bonafide requests for disclosure of trade secret information to medical personnel must be made in accordance with the provisions contained in 29 CFR 1910.1200 I 1-13.

Section 4: First Aid Measures

Description of First Aid Measures

Inhalation	Remove to fresh air. If not breathing, provide CPR (cardio pulmonary resuscitation). Get immediate medical attention.
Skin Contact	Immediately wash skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing.
Eye Contact	Immediately flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.
Ingestion	If swallowed do not induce vomiting, give large quantities of water to drink. Never give anything to an unconscious person. Get immediate medical attention.

Most important symptoms and effects, both acute and delayed

Symptoms/Injuries after Inhalation	May cause respiratory tract irritation. May cause dizziness, headache, nausea and mental confusion.
Symptoms/Injuries after Skin Contact	May cause skin irritation. Symptoms may include redness, drying, defatting, and cracking of the skin.
Symptoms/Injuries after Eye Contact	May cause eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.
Symptoms/Injuries after Ingestion	May be harmful if swallowed. May cause stomach distress, nausea, or vomiting.

Indication of any immediate medical attention and special treatment needed

Symptoms may not appear immediately. In case of accident or if you feel unwell, seek medical advice immediately.

Section 5: Fire-fighting Measures

Suitable extinguishing media	Use foam, dry chemical, or carbon dioxide.
Special hazards arising from the substance or mixture	No data available.
Protective actions fire-fighters	Wear standard protective equipment and self-contained breathing apparatus for firefighting if necessary.
Further information	Irritating and toxic gases may be generated when involved in fire.

Section 6: Accidental Release Measures

Personal precautions, protective equipment, and emergency procedures



Wear proper personal protective equipment. Avoid breathing vapors or mist.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Prevent spills or contaminated rinse water from entering sewers or watercourses.

Methods and materials for containment and cleaning up

In case of small spills, absorb with inert materials such as earth or dry sand. Place in a chemical waste container. In case of large spills, dike the spill, if possible. Call emergency services. Absorb the chemical.

Reference to other Sections For personal protection reference section 8. For disposal reference section 13.

Section 7: Handling and Storage

Precautions for safe handling

- Use only with adequate ventilation.
- Do not inhale vapors.
- Avoid spilling and releasing vapor.
- Wear proper protective equipment when handling this material.
- Avoid contact with skin, eyes, or clothing.
- Wash hands and face after handling this material.
- Appropriate container should be used for disposal.
- For precautions see section 2.

Conditions for safe storage, including any incompatibilities

- Store upright in a cool, dry place.
- Keep container closed when not in use.
- Do not store with acetylene, strong hydrogen peroxide solutions, ammonia nitric acid, and sulfuric acid.
- Utilize chemical segregation.
- Follow all applicable local regulations for handling and storage.

Specific uses

Silver conductive ink for 3D printing

Section 8: Exposure Controls/Personal Protection

Control Parameters

PRODUCT COMPOSITION	ACGIH TLV	OSHA PEL	NIOSH REL
Silver	0.1 mg/m ³ (metal)	TWA 0.01 mg/m ³	TWA 0.01 mg/m ³
Dipropylene glycol, monomethyl ether	TWA 100 STEL 150	TWA 100 ppm (600 mg/m ³) STEL 150 ppm (900 mg/m ³)	REL 100 ppm (600 mg/m ³) STEL 150 ppm (900 mg/m ³)
Alcohol ethoxylate, polymer	--	--	--

Exposure controls

VENTILATION:

Always provide good general, mechanical room ventilation where this chemical/material is used.

SPECIAL VENTILATION CONTROLS:

None

RESPIRATORY PROTECTION:

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or the CEN European Standards (EU). Use a NIOSH/MSHA or European Standard (EN) approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

PROTECTIVE GLOVES:

Neoprene, butyl, or nitrile rubber gloves are recommended.

EYE PROTECTION:

Recommend eye protection using safety glasses or goggles.

SKIN PROTECTION:

Suitable protective clothing to prevent skin contact

WORK/HYGIENE PRACTICES:

Avoid breathing vapor. Avoid contact with eyes. Wash hands after handling.



OTHER EQUIPMENT:

Make safety shower, eyewash stations, and hand washing equipment available in the work area.

Section 9: Physical and Chemical Properties

	PRODUCT CRITERIA
APPEARANCE - COLOR:	Silver
PHYSICAL STATE:	Metallic paste
ODOR:	Slight odor
ODOR THRESHOLD	No data available
PH	No data available
MELTING POINT/FREEZING POINT:	No data available
INITIAL BOILING POINT AND BOILING RANGE:	No data available
FLASH POINT:	No data available
EVAPORATION RATE:	No data available
FLAMMABILITY (Solid, gas)	No data available
UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS	Not Measured
VAPOR PRESSURE	No data available
VAPOR DENSITY (AIR = 1)	No data available
RELATIVE DENSITY (@25 °C):	~3.7
SOLUBILITY (IES)	Insoluble
OXIDIZING PROPERTIES	No data available
PARTITION COEFFICIENT: n-octanol/water	No data available
AUTO IGNITION TEMPERATURE	No data available
DECOMPOSITION TEMPERATURE	No data available
VISCOSITY	No data available

Section 10: Stability and Reactivity

Reactivity:	Reacts with strong acids, hydrogen peroxide, and ammonia.
Chemical Stability:	Stable under recommended conditions.
Possibility of Hazardous Reactions:	Will not occur under normal temperatures and pressures.
Conditions to Avoid:	Separate from ammonia, strong hydrogen peroxide, and strong acids.
Incompatibility (Materials to Avoid):	Acetylene, strong hydrogen peroxide solutions, ammonia nitric acid, sulfuric acid.
Hazardous Decomposition Products:	Decomposition products include silver oxides.

Section 11: Toxicological Information

GHS Required Criteria	Toxicity Criteria	Toxicity Information	Comments	Chemical Constituent
Acute Toxicity	LD50(Oral/Rat):	>5000 mg/kg		Silver
	LD50(Dermal/Rat):	>2000 mg/kg		Silver
	LD50(Oral/Rat): (ingestion)	>5000 mg/kg		Alcohol ethoxylate, polymer
Skin Corrosion/Irritation	Causes skin irritation			Polyurethane polymer (constituent of)
Serious Eye Damage / Eye Irritation	Causes eye irritation (mild irritation by rabbit, 48 hr.)		Category 2B	Silver
	Causes serious eye irritation (severe/chronic eye irritation in humans)			Polyurethane polymer, (constituent of)
	Irritating to eyes (rabbit)			Alcohol ethoxylate, polymer
Respiratory or Skin Sensitization	May cause an allergic skin reaction		Category 1	Silver
Germ Cell Mutagenicity	Data not available			
Carcinogenicity	NTP	Known to be carcinogen in humans		Formaldehyde
	IARC	May cause cancer	Category 1A	Formaldehyde
	OSHA	Specifically regulated carcinogen		Formaldehyde
	ACGIH	Suspected of causing cancer	Category 2A	Formaldehyde
Reproductive Toxicity	Suspected of damaging fertility or the unborn child		Category 2	Cyclic amide
STOT -- Single Exposure	Causes damage to organs (respiratory system)		Category 1	Silver



	May cause respiratory tract irritation (mice-2hr., rats-4hr.)	Category 3	Cyclic amide, formaldehyde, and dipropylene glycol monomethyl ether
STOT – Repeated Exposure	Causes damage through prolonged or repeated exposure (eye)	Category 1 (eye) Category 1 (Inhalation of dust: respiratory)	Silver
	Cause damage to organs through prolonged or repeated exposure (bone marrow, spleen, liver, respiratory system, adrenal gland, kidney) (Rats-90 day, 0.16 mg/l)	Category 1 (bone marrow, spleen, liver, respiratory system, adrenal gland, kidney)	Cyclic amide
Aspiration Hazard		Data not available	

STOT = Specific Target Organ Toxicity

Section 12: Ecological Information

		Chemical Constituent
Toxicity:	Since its toxic values are > 100mg/L for algae (Scenedesmus), crustaceans (Daphnia magna), and fish (rainbow trout) (SIDS, 2007), the substance was classified into "Not classified".	Polyurethane polymer (constituent of)
	As it is water soluble (water solubility: 1000000mg/L (SRC, 2005)) and its classification for acute toxicity is "Not classified", the substance was classified into "Not classified".	Polyurethane polymer (constituent of)
	LC50(Fish) > 10 mg/L	Alcohol ethoxylate, polymer
	EC50 (Daphnia, 48hr.) > 1 mg/L	Alcohol ethoxylate, polymer
	EC50 (Algae) > 10 mg/L	Alcohol ethoxylate, polymer
	EC50 (microorganisms, effects on activated sludge) > 1000 mg/L	Alcohol ethoxylate, polymer
Persistence and degradability:	Readily biodegradable	Cyclic amide, formaldehyde and dipropylene glycol monomethyl ether
	Poorly biodegradable	Alcohol ethoxylate, polymer
Bioaccumulative potential	No information is available.	
Mobility in soil:	No information is available.	
PBT and vPvB assessment:	PBT/vPvB assessment not available as chemical assessment not required/not conducted	
Other adverse effects:	May be hazardous to the environment; special attention should be given to aquatic organisms	Silver
	Does not present a significant risk to aquatic organisms at low concentrations (< 100 mg/L)	Alcohol ethoxylate, polymer

Section 13: Disposal Considerations

Waste from residues/unused products: Follow the waste disposal requirements of your country, state, or local authorities.

Contaminated packaging: Contaminated packaging material should be disposed of as stated above for residues and unused product.

Rinsate: Do not dispose of rinse water containing product in a sanitary sewer system or stormwater drainage system.

Section 14: Transport Information

DOT TRANSPORT: Not Regulated

ADR = International Carriage of Dangerous Goods by Road Not Regulated

RAIL TRANSPORT: Not Regulated

SEA TRANSPORT: IMDG Not Regulated

AIR TRANSPORT: IATA/ICAO Not Regulated

Section 15: Regulatory Information



TOXIC SUBSTANCE CONTROL ACT (TSCA) STATUS:

This product is in compliance with rules, regulations, and orders of TSCA. All components are either listed on the TSCA inventory or are considered exempt.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III SECTION 313 SUPPLIER NOTIFICATION:

This regulation requires submission of annual reports of toxic chemical(s) that appear in section 313 of the Emergency Planning and Community Right To Know Act of 1986 and 40 CFR 372. This information must be included in all SDS's that are copied and distributed for the material.

The Section 313 toxic chemicals contained in this product are: Silver, N-methyl-2-pyrrolidone, Formaldehyde

CALIFORNIA PROPOSITION 65:

This regulation requires a warning for California Proposition 65 chemical(s) under the statute.

The California proposition 65 chemical(s) contained in this product are: Formaldehyde

STATE RIGHT-TO-KNOW TOXIC SUBSTANCE OR HAZARDOUS SUBSTANCE LIST:

Massachusetts's hazardous substance(s):	Silver, N-methyl-2-pyrrolidone, Formaldehyde
Pennsylvania hazardous substance code(s):	Silver, N-methyl-2-pyrrolidone, Formaldehyde
New Jersey	Silver, N-methyl-2-pyrrolidone, Formaldehyde

CANADA:

WHMIS-2015: This SDS is in compliance with WHMIS 2015 (HPR / new HPA).

EUROPEAN UNION:

This product has been reviewed for compliance with the following European Community Directives: REACH 1907/2006; Regulation (EC) No 1272/2008 on classification, labeling, and packaging (CLP) of substances and mixtures.

Section 16: Other Information

Initial issue date:	October 1, 2015
Final revision date:	March 11, 2016
Revision Number:	1
Revision explanation	Initial version
Information Sources:	RTECS, ECHA, REACH, OSHA 29CFR 1910.1200

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