

SAFETY DATA SHEET

CW2900 CircuitWorks(R) Flex Conductive Pen

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Identification of the substance or mixture

Product name : CW2900 CircuitWorks(R) Flex Conductive Pen
Chemical name : Flex Conductive Pen
Synonyms : Silver Flex Conductive Pen
Product type : Liquid.

Company/undertaking identification

Manufacturer : ITW Chemtronics
8125 Cobb Center Drive
Kennesaw, GA 30152

Tel. 770-424-4888 or toll free 800-645-5244

Distributor :

Importer : ITW Contamination Control BV
Saffierlaan 5
VZ-2132 Hoofddorp
The Netherlands

Email: info@itw-cc.com

Tel: +31 88 1307 400

FAX: +31 88 1307 499

e-mail address of person responsible for this SDS : askchemtronics@chemtronics.com

Emergency telephone number (with hours of operation) : Chemtrec - 1-800-424-9300 or collect 703-527-3887

2. HAZARDS IDENTIFICATION

The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

Classification : R10
Xi; R36
R66, R67
N; R50

Physical/chemical hazards : Flammable.

Human health hazards : Irritating to eyes. Repeated exposure may cause skin dryness or cracking. Vapours may cause drowsiness and dizziness.

Environmental hazards : Very toxic to aquatic organisms.

See Section 11 for more detailed information on health effects and symptoms.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/preparation : Preparation

Ingredient name	CAS number	%	EC number	Classification
SILVER	7440-22-4	45 - 65	231-131-3	N; R50 [1] [2]
2-methoxy-1-methylethyl acetate	108-65-6	10 - 30	203-603-9	R10 [1] [2] Xi; R36
n-butyl acetate	123-86-4	10 - 30	204-658-1	R10 [1] [2] R66, R67
butanone	78-93-3	3 - 15	201-159-0	F; R11 [1] [2] Xi; R36 R66, R67
See Section 16 for the full text of the R-phrases declared above.				

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

[1] Substance classified with a health or environmental hazard

[2] Substance with a workplace exposure limit

Occupational exposure limits, if available, are listed in Section 8.

4. FIRST AID MEASURES

First-aid measures

- Inhalation** : Move exposed person to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Ingestion** : Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Wash skin thoroughly with soap and water or use recognised skin cleanser. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

See Section 11 for more detailed information on health effects and symptoms.

5. FIRE-FIGHTING MEASURES

Extinguishing media

- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapour/gas is heavier than air and will spread along the ground. Vapours may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.
- Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. This material is very toxic to aquatic organisms. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
metal oxide/oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the

6. ACCIDENTAL RELEASE MEASURES

same hazard as the spill product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. HANDLING AND STORAGE

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not breathe vapour or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid release to the environment. Refer to special instructions/safety data sheet. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.
- Packaging materials**
- Recommended** : Use original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit values

<u>Ingredient name</u>	<u>Occupational exposure limits</u>
SILVER	EU OEL (Europe, 5/2006). Notes: Indicative 8 hours: 0.1 mg/m ³ 8 hour(s).
2-methoxy-1-methylethyl acetate	EU OEL (Europe, 5/2006). Skin Notes: Indicative short term: 550 mg/m ³ 15 minute(s). short term: 100 ppm 15 minute(s). 8 hours: 275 mg/m ³ 8 hour(s). 8 hours: 50 ppm 8 hour(s).
n-butyl acetate	ACGIH TLV (United States, 1/2007). STEL: 200 ppm 15 minute(s). TWA: 150 ppm 8 hour(s).
butanone	EU OEL (Europe, 5/2006). Notes: Indicative short term: 900 mg/m ³ 15 minute(s). short term: 300 ppm 15 minute(s). 8 hours: 600 mg/m ³ 8 hour(s). 8 hours: 200 ppm 8 hour(s).

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances.

Exposure controls

- Occupational exposure controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Eye protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Skin protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. PHYSICAL AND CHEMICAL PROPERTIESGeneral informationAppearance

- Physical state** : Liquid.
- Colour** : Silvery. [Light]

Important health, safety and environmental information

- Boiling point** : Lowest known value: 79.62°C (175.3°F) (Butanone). Weighted average: 125.58°C (258°F)
- Melting point** : May start to solidify at the following temperature: -75°C (-103°F) This is based on data for the following ingredient: n-butyl acetate. Weighted average: -78.43°C (-109.2°F)
- Flash point** : Closed cup: 24°C (75.2°F). (Tagliabue.)
- Explosive properties** : Non-explosive in the presence of the following materials or conditions: open flames, sparks and static discharge, heat, shocks and mechanical impacts, oxidizing materials, reducing materials, combustible materials, organic materials, metals, acids, alkalis and moisture.
- Relative density** : Weighted average: 1.73 (Water = 1)
- Partition coefficient: n-octanol/water** : The product is insoluble in water and octanol.
- Vapour density** : >1 (Air = 1)
- Evaporation rate (butyl acetate = 1)** : <1 compared with butyl acetate

Other information

- Auto-ignition temperature** : Lowest known value: 420.9°C (789.6°F) (n-butyl acetate).

10. STABILITY AND REACTIVITY

- Stability** : The product is stable. Under normal conditions of storage and use, hazardous polymerisation will not occur.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas. Avoid release to the environment. Refer to special instructions/safety data sheet.
- Materials to avoid** : Reactive or incompatible with the following materials: oxidizing materials
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. TOXICOLOGICAL INFORMATIONPotential acute health effects

- Inhalation** : Vapours may cause drowsiness and dizziness.
- Ingestion** : No known significant effects or critical hazards.
- Skin contact** : Defatting to the skin. May cause skin dryness and irritation.
- Eye contact** : Irritating to eyes.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2-Methoxy-1-methylethyl acetate	LD50 Dermal	Rabbit	>5 g/kg	-
	LD50 Oral	Rat	8532 mg/kg	-
n-butyl acetate	LD50 Dermal	Rabbit	>17600 mg/kg	-
	LD50 Oral	Rat	10768 mg/kg	-
Butanone	LD50 Dermal	Rabbit	6480 mg/kg	-
	LD50	Rat	607 mg/kg	-
	Intraperitoneal LD50 Oral	Rat	2737 mg/kg	-

Potential chronic health effects

- Chronic effects** : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.
- Carcinogenicity** : No known significant effects or critical hazards.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.

Over-exposure signs/symptoms

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11. TOXICOLOGICAL INFORMATION

Inhalation	: Adverse symptoms may include the following: nausea or vomiting headache drowsiness/fatigue dizziness/vertigo
Ingestion	: No specific data.
Skin	: Adverse symptoms may include the following: irritation dryness cracking
Eyes	: Adverse symptoms may include the following: irritation watering redness
Target organs	: Contains material which causes damage to the following organs: lungs, mucous membranes, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea, nose/sinuses.

12. ECOLOGICAL INFORMATION

Environmental effects : Very toxic to aquatic organisms.

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
SILVER	-	Acute EC50 9.2 ppb Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute EC50 9.5 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute EC50 0.24 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute LC50 0.0062 mg/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	-	Acute LC50 6.25 to 7.3 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	-	Acute LC50 4.7 to 5.62 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	-	Acute LC50 3.42 to 4.05 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	-	Acute LC50 3.12 to 3.73 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	-	Acute LC50 2.76 to 3.33 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	-	Acute LC50 2.38 to 3.04 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	-	Acute LC50 2.13 to 2.93 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	-	Acute LC50 0.013 mg/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	-	Acute LC50 0.0081 mg/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	-	Acute LC50 15 to 18 ug/L Fresh water	Crustaceans - Water flea - Simocephalus vetulus	48 hours

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	-	Acute LC50 14 ug/L Fresh water	Daphnia - Water flea - Daphnia pulex	48 hours
	-	Acute LC50 11 to 14 ug/L Fresh water	Daphnia - Water flea - Ceriodaphnia reticulata	48 hours
n-butyl acetate	-	Acute LC50 185000 ug/L Marine water	Fish - Inland silverside - Menidia beryllina	96 hours
	-	Acute LC50 100000 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours
	-	Acute LC50 62000 ug/L	Fish - Zebra danio - Danio rerio	96 hours
	-	Acute LC50 32000 ug/L Marine water	Crustaceans - Brine shrimp - Artemia salina	48 hours
	-	Acute LC50 18000 to 19000 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
Butanone	-	Acute EC50 5091000 to 6440000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute LC50 >400 ppm Marine water	Fish - Sheepshead minnow - Cyprinodon variegatus	96 hours
	-	Acute LC50 3220000 to 3320000 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas	96 hours
	-	Acute LC50 >520000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute LC50 5600000 ug/L Fresh water	Fish - Western mosquitofish - Gambusia affinis	96 hours
	-	Chronic NOEC 400 ppm Marine water	Fish - Sheepshead minnow - Cyprinodon variegatus	96 hours

- Conclusion/Summary** : Not available.
- Biodegradability**
- Conclusion/Summary** : Not available.
- Other adverse effects** : No known significant effects or critical hazards.

13. DISPOSAL CONSIDERATIONS

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Hazardous waste : The classification of the product may meet the criteria for a hazardous waste.

14. TRANSPORT INFORMATION

International transport regulations

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
ADR/RID Class	Not regulated.	-	-	-		-
ADN/ADNR Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA Class	Not regulated.	-	-	-		-

14. TRANSPORT INFORMATION

PG* : Packing group

15. REGULATORY INFORMATION**EU regulations**

Classification and labeling have been determined according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.

Hazard symbol or symbols :



Irritant, Dangerous for the environment

Risk phrases

: R10- Flammable.
R36- Irritating to eyes.
R66- Repeated exposure may cause skin dryness or cracking.
R67- Vapours may cause drowsiness and dizziness.
R50- Very toxic to aquatic organisms.

Safety phrases

: S2- Keep out of the reach of children.
S29- Do not empty into drains.
S46- If swallowed, seek medical advice immediately and show this container or label.
S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

Product use

: Consumer applications.

Europe inventory

: **Europe inventory:** Not determined.

16. OTHER INFORMATION

Full text of R-phrases referred to in sections 2 and 3 - Europe

: R11- Highly flammable.
R10- Flammable.
R36- Irritating to eyes.
R66- Repeated exposure may cause skin dryness or cracking.
R67- Vapours may cause drowsiness and dizziness.
R50- Very toxic to aquatic organisms.

Full text of classifications referred to in sections 2 and 3 - Europe

: F - Highly flammable
Xi - Irritant
N - Dangerous for the environment

History

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Prepared by : Not available.

☑ Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.