

MATERIAL SAFETY DATA SHEET CONDUCTIVE SILVER PRINTING PASTE

SECTION 1: Identification of the substance / mixture and of the company / undertaking

1.1 Product Identifiers

Product name : CONDUCTIVE SILVER PRINTING PASTE
Brand : DML DM-SIP
Product codes : DM-SIP-3102S

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Dycotec Materials Ltd
Unit 12 Star West,
Westmead Drive, Westlea,
Swindon, Wiltshire SN5 7SW, UK
Telephone : +44 (0) 1788 814025
E-mail address : info@dycotecmaterials.com

1.4 Emergency telephone number

Emergency Phone No. : +44 (0) 7495 248908

SECTION 2: Hazards Identification

2.1 Classification of the substance or mixture

Classification (EC 1272/2008)

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319

2.2 Label elements

Pictogram



Signal word: Warning

Hazard statements :
H302 + H312 + H332 : Harmful if swallowed, in contact with skin or if inhaled.
H315 : Causes skin irritation.
H319 : Causes serious eye irritation.

Precautionary statements :
P261 : Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P301 + P312 + P330 : IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352 + P312 : IF ON SKIN: Wash with plenty of water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P312 : IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
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.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Hazardous ingredients according to Regulation (EC) No 1272/2008

| Component / CAS # | EC # | % | Classification |
|-----------------------------|-----------|-------|---|
| Silver 7440-22-4 | 231-131-3 | 30-90 | |
| 2-Butoxyethanol 111-76-2 | 203-905-0 | 1-30 | Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; H302, H332, H312, H315, H319 |

See Section 16 for full text of H phrases.

SECTION 4: FIRST AID MEASURES**4.1 Description of first aid measures****Inhalation**

Remove to fresh air. If breathing is difficult, give oxygen. Apply artificial respiration if patient is not breathing. Obtain medical attention immediately.

Ingestion

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

Skin contact

Remove contaminated clothing and shoes without delay. Wear impermeable gloves. Wash immediately with plenty of water. Pay particular attention to skin crevices, nail folds, etc. Do not reuse contaminated clothing without laundering. Do not reuse contaminated leatherware. Obtain medical attention.

Eye contact

Rinse thoroughly with plenty of water for at least 15 minutes. Obtain medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

Not applicable

4.3 Indication of any immediate medical attention and special treatment needed

Not applicable

SECTION 5: FIRE-FIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol foam, carbon dioxide or dry chemical to extinguish fires. Water stream may be ineffective.

5.2 Special hazards arising from the substance or mixture

Keep containers cool by spraying with water if exposed to fire.

5.3 Advice for firefighters**Protective Equipment:**

Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing.

5.4 Further information

No data available

SECTION 6: ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Vapours can accumulate in low areas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Wipe up with absorbent material (e.g. cloth, fleece) and arrange disposal. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Areas containing this material should have fire safe practices and electrical equipment in accordance with applicable regulations and/or guidelines. Standards are primarily based on the material's flashpoint, but may also take into account properties such as miscibility with water or toxicity. All local and national regulations should be followed.

Store in a cool, dry, well ventilated place and keep container tightly closed. Avoid flammable gas mixtures. Take precautionary measures against electrostatic loading - earthing necessary during loading operations.

Storage Temperature: Room Temperature, 20°C
Storage class (TRGS 510): Non-combustible

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters – Components with workplace control parameters

| Component | CAS-No. | Value Form of exposure | Control parameter | Basis |
|-----------------|-----------|---|---------------------------------|--|
| Silver | 7440-22-4 | TWA | 0.1 mg/m ³ | UK. EH40 WEL – Workplace Exposure Limits |
| | Remarks | Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used | | |
| | | TWA | 0.1 mg/m ³ | Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values |
| | | Indicative | | |
| 2-Butoxyethanol | 111.76-2 | TWA | 20 ppm 98 mg/m ³ | Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values |
| | Remarks | Identifies the possibility of significant uptake through the skin Indicative | | |
| | | STEL | 50 ppm 246 mg/m ³ | Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values |
| | | Identifies the possibility of significant uptake through the skin Indicative | | |
| | | TWA | 25 ppm | UK. EH40 WEL – Workplace Exposure Limits |
| | | Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity. | | |
| | | STEL | 50 ppm | UK. EH40 WEL – Workplace Exposure Limits |
| | | Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity. | | |
| | | | | |

8.2 Exposure Controls

Protective equipment



Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Eye/face protection

Use approved safety glasses with side shields. Eyewear complying with an approved standard should be worn if a risk assessment indicate eye contact is possible. The following protection should be worn: Chemical splash goggles or face shield.

Skin protection

Prevent contamination of skin or clothing when removing protective equipment. Barrier creams may be used in conjunction with the gloves to provide additional skin protection. Wear impermeable gloves and suitable protective clothing.

Hand protection

Use neoprene, nitrile, or rubber gloves to prevent skin contact. Gloves must be inspected prior to use. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it. Wear protective gloves made of the following material: Nitrile rubber. The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Hygiene measures

Do not smoke in work area. Wash hands thoroughly after handling. Promptly remove any clothing that becomes contaminated. When using do not eat, drink or smoke. Contaminated clothing should be placed in a closed container for disposal of decontamination. Warn cleaning personnel of any hazardous properties of the product.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particlerespirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

| | |
|--|-------------------|
| Appearance | Paste |
| Colour | Grey Silver |
| Odour | No data available |
| Odour Threshold | No data available |
| pH | No data available |
| Melting / 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 | No data available |
| Vapour pressure | No data available |
| Vapour density | No data available |
| Relative density | No data available |
| Water solubility | No data available |
| Partition coefficient | No data available |
| Auto-ignition temperature | No data available |
| Decomposition temperature | No data available |
| Viscosity | No data available |
| Explosive properties | No data available |
| Oxidizing properties | No data available |

9.1 Other information

No data available

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks. May form peroxides of unknown stability.

10.5 Incompatible materials

Strong oxidizing agents, Strong bases, Strong acids.

10.6 Hazardous decomposition products

Other decomposition products - no data available

In the event of fire - see section 5

SECTION 11: TOXICOLOGICAL INFORMATION

Acute toxicity:

LD50 Oral - Rat - male - 880 mg/kg (2-Butoxyethanol)

(OECD Test Guideline 401)

LD50 Dermal - Rabbit - male - 1,060 mg/kg (2-Butoxyethanol)

(OECD Test Guideline 402)

LD50 Intraperitoneal - Rat - 220 mg/kg (2-Butoxyethanol)

LD50 Intravenous - Rat - 307 mg/kg (2-Butoxyethanol)

Skin corrosion/irritation:

Skin - Rabbit (2-Butoxyethanol)

Result: Skin irritation - 20 h

Serious eye damage/eye irritation:

Eyes - Rabbit (2-Butoxyethanol)

Result: Eye irritation - 24 h

(OECD Test Guideline 405)

(OECD Test Guideline 405)

Respiratory or skin sensitization:

Maximisation Test (GPMT) - Guinea pig (2-Butoxyethanol)

Result: Does not cause skin sensitisation.

(OECD Test Guideline 406)

Germ cell mutagenicity:

Hamster ovary (2-Butoxyethanol)

Result: negative

OECD Test Guideline 474

Mouse - male (2-Butoxyethanol)

Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity:

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals. (2-Butoxyethanol)

No adverse effect has been observed in chronic toxicity tests.

Developmental Toxicity - Rabbit – Dermal

No adverse effect has been observed in chronic toxicity tests.

Specific target organ toxicity – single exposure:

No data available

Specific target organ toxicity – repeated exposure:

No data available

Aspiration hazard:

No data available

Additional Information:

Human exposure above 200 ppm can be expected to cause narcosis, damage to the kidney and liver and present an abnormal blood picture showing erythropenia, reticulocytosis, granulocytosis, leukocytosis, and would be likely to cause fragility of erythrocytes and hematuria.

Swallowing of 2-butoxyethanol results in a sour taste that turns to a burning sensation and is followed by numbness of the tongue which indicates paralysis of the sensory nerve endings., Central nervous system depression, Headache, narcosis. (2-Butoxyethanol)

SECTION 12: ECOLOGICAL INFORMATION**TOXICITY, PERSISTENCE AND DEGRADABILITY, BIOACCUMULATIVE POTENTIAL, MOBILITY IN SOIL, OTHER ADVERSE EFFECTS****HAZARDOUS INGREDIENT TOXICITY DATA**

| Component / CAS # | Toxicity to Algae | Toxicity to Fish | Toxicity to Water Flea |
|-----------------------------|---|---|---|
| Silver 7440-22-4 | No data available | No data available | No data available |
| 2-Butoxyethanol 111-76-2 | Growth inhibition EC50 - Pseudokirchneriella subcapitata (green algae) - 1,840 mg/l - 72 h (OECD Test Guideline 201) | static test LC50 - Oncorhynchus mykiss (rainbow trout) - 1,474 mg/l - 96 h (OECD Test Guideline 203) | Immobilization EC50 - Daphnia magna (Water flea) - 1,550 mg/l - 48 h (OECD Test Guideline 202) |

Persistence and degradability

Biodegradability aerobic - Exposure time 28 d (2-Butoxyethanol)

Result: 90.4 % - Readily biodegradable

(OECD Test Guideline 301B)

Remarks: The 10 day time window criterion is not fulfilled.

Ratio BOD/ThBOD 88 %

Bioaccumulative potential

No data available

Mobility in soil

No data available

Results of PBT and vPvB assessment

No data available

Other adverse effects

No data available

SECTION 13: DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods**

The company encourages the recycle and reuse of products and packaging, where possible and permitted.

General Information

When handling waste, the safety precautions applying to handling of the product should be considered. Do not dump into any sewers, on the ground, or into any body of water. Not to be disposed of together with household waste. Any disposal practice must be in compliance with all local and national laws and regulations. Handle and dispose contaminated packages in the same way as the product itself.

Disposal methods

When recycle or reuse is not possible, the company recommends that our products, especially when classified as hazardous, be disposed of by thermal treatment or incineration at approved facilities. All local and national regulations should be followed. For disposal within the European Community, waste codes according to Directive 2008/98/EC should be assigned by the user based on the application for which the product was used.

Disposal-relevant information

Do not release directly or indirectly to surface water, ground water, soil or public sewage system.

Contaminated packaging

Dispose of as unused product.

SECTION 14: TRANSPORT INFORMATION**14.1 UN number**

| ADR/RID | IMDG | IATA |
|---------|------|------|
| - | - | - |

14.2 UN proper shipping name

| ADR/RID | IMDG | IATA |
|---------------------|---------------------|---------------------|
| Not dangerous goods | Not dangerous goods | Not dangerous goods |

14.3 Transport hazard class(es)

| | | |
|---------|------|------|
| ADR/RID | IMDG | IATA |
| - | - | - |

14.4 Packaging group

| | | |
|---------|------|------|
| ADR/RID | IMDG | IATA |
| - | - | - |

14.5 Environmental hazards

| | | |
|---------|-----------------------|------|
| ADR/RID | IMDG Marine pollutant | IATA |
| no | no | no |

14.6 Special precautions for user

No data available

SECTION 15: REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

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

no data available

15.2 Chemical Safety Assessment

no data available

SECTION 16: OTHER INFORMATION**Revision Date:** 01-Aug-2018**General Information**

The information contained herein is, to the best of our knowledge and belief, accurate. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user. Since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable local laws and regulations.

Hazard statements in full

H302 + H312 + H332

Harmful if swallowed, in contact with skin or if inhaled.

H315

Causes skin irritation.

H319

Causes serious eye irritation.