MATERIAL SAFETY DATA SHEET
Transparent Conductive Ink

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

1.1 Product Identifiers
Product name: Transparent Conductive Ink
Brand: DM-SNW-80xx-IPA
Product codes: Research Batch. This MSDS is for product trials only
REACH No.: Not available. Annual tonnage does not require a registration.

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Scientific research and development, professional use only. Industrial Ink

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 Only available during office hours

SECTION 2: Hazards Identification

2.1 Classification of the substance or mixture
Physical hazards: H225
Health hazards: H319: Causes serious eye irritation
Environmental hazards: H336: May cause dizziness
Physicochemical: Stable under ordinary conditions of storage for flammable liquids

Repeated long-term exposure to silver dust can cause permanent blue-grey staining of eyes, month and skin. Direct contact with eyes is likely irritating.

2.2 Label elements
Pictogram

Signal word: Danger
Hazard statements:
H225: Highly flammable liquid and vapour
H319: Causes serious eye irritation
H336: May cause dizziness
Precautionary statements:
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P280: Wear protective gloves / protective clothing / eye protection / face protection.
P271: Use only outdoors or in a well-ventilated area.
P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse SKIN with water/shower.
P304 + P340: IF INHALED: Remove victim to fresh air and Keep at rest in a position 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 ABC for extinction.
P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
P501: Dispose of contents/container according to hazardous waste regulations.

2.3 Other hazards
No data available
SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS #</th>
<th>EC #</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>231-131-3</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>2-Propanol</td>
<td>67-63-0</td>
<td>200-661-7</td>
<td>&gt;95%</td>
</tr>
</tbody>
</table>

The full text for all Hazard Statements are displayed in Section 16.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General information
Remove affected person from source of contamination. Remove contaminated clothing. First aid personnel must be aware of own risk during rescue. Consult a physician. Show this safety data sheet to the doctor in attendance.

Inhalation
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention immediately.

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

Skin contact
Flush with copious amounts of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Seek medical attention if irritation develops or persists. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing media

5.2 Special hazards arising from the substance or mixture
Carbon oxides. Metal oxides.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. Remove all source of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. 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.

6.3 Methods and materials for containment and cleaning up
Wipe up with inert absorbent material and disposal of as hazardous waste. 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. Keep away from source of ignition – No smoking. Take measures to prevent the build up of electrostatic charge.

7.2 Conditions for safe storage, including any incompatibilities
Kept upright to prevent leakage. Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Storage class: Flammable liquids

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
No occupational exposure limits known.

8.2 Exposure Controls

Protective equipment

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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.

Hand protection
Handle with gloves. Gloves must be inspected prior to use. 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.

Other skin and body protection
Impervious clothing, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

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 orsmoke. 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
If ventilation is inadequate, suitable respiratory protection must be worn.

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>liquid slurry</td>
</tr>
<tr>
<td>Colour</td>
<td>grey</td>
</tr>
<tr>
<td>Odour</td>
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</tr>
<tr>
<td>Odour Threshold</td>
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</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting / freezing point</td>
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</tr>
<tr>
<td>Initial boiling point and boiling range</td>
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</tr>
<tr>
<td>Flash point</td>
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</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
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</tr>
<tr>
<td>Vapour density</td>
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</tr>
<tr>
<td>Relative density</td>
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</tr>
<tr>
<td>Water solubility</td>
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</tr>
<tr>
<td>Partition coefficient</td>
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</tr>
<tr>
<td>Auto-ignition temperature</td>
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</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
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<tr>
<td>Viscosity</td>
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<tr>
<td>Explosive properties</td>
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<tr>
<td>Oxidizing properties</td>
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</tbody>
</table>

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. Stable at normal ambient temperatures.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks

10.5 Incompatible materials
Oxidizing agents, Acid anhydrides, Halogenated compounds, 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: Mixture. No known toxicological effects from this product.

Skin corrosion/irritation: Mixture. No data available

Germ cell mutagenicity: Mixture. No data available

Carcinogenicity: Mixture. No data available

Reproductive toxicity: Mixture. No data available

Specific target organ toxicity – single exposure: Mixture. No data available

Specific target organ toxicity – repeated exposure: Mixture. No data available

Aspiration hazard: Mixture. No data available

Signs and Symptoms of Exposure: Mixture. No data available

Additional Information: Mixture. No data available.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity
Do not empty into drains, soil or bodies of water.

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
no data available

12.6 Other adverse effects
no data available

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

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
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: TRANSPORT INFORMATION

14.1 UN number
**14.2 UN proper shipping name**

<table>
<thead>
<tr>
<th>ADR/RID</th>
<th>IMDG</th>
<th>IATA</th>
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<tbody>
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**14.3 Transport hazard class(es)**

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**14.4 Packaging group**

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</thead>
<tbody>
<tr>
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**14.5 Environmental hazards**

<table>
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<th>ADR/RID</th>
<th>IMDG</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Marine pollutant</td>
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</table>

**14.6 Special precautions for user**

Read safety instructions, SDS and emergency procedures before handling.

**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**

For this product a chemical safety assessment was not carried out.

**SECTION 16: OTHER INFORMATION**

**General Information**

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. 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 finished 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. This is an experimental product. This safety data sheet is for product trials only!

**Hazard statements in full**

H225 Highly flammable liquid and vapour. Flam. Liq. 2

H319 Causes serious eye irritation. Eye Irrit. 2;

H336 May cause drowsiness or dizziness. STOT SE 3