

MATERIAL SAFETY DATA SHEET SILVER NANOWIRE PASTE

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

1.1 Product Identifiers

Product name : SILVER NANOWIRE PASTE
Brand : DML DM-SNW
Product codes : DM-SNW-8010

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 3), H301
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Acute toxicity, Dermal (Category 3), H311
Acute toxicity, Inhalation (Category 3), H331
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - single exposure (Category 1), H370
Specific target organ toxicity - repeated exposure, Oral (Category 2), Kidney, H373

2.2 Label elements

Pictogram



Signal word: Danger

Hazard statements:

H301 + H311 + H331

H302

H315

H318

H335

H336

H370

H373

Toxic if swallowed, in contact with skin or if inhaled

Harmful if swallowed.

Causes skin irritation.

Causes serious eye damage.

May cause respiratory irritation.

May cause drowsiness or dizziness.

Causes damage to organs.

May cause damage to organs (Kidney) through prolonged or repeated exposure if swallowed.

Precautionary statements:

P210

P260

P280

P301 + P312 + P330

P304 + P340 + P312

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

Wear protective gloves/ protective clothing.

IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON

P305 + P351 + P338 + P310

CENTER/doctor if you feel unwell.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

P403 + P235

Store in a well-ventilated place. Keep cool.

2.3 Other hazards

None known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**3.2 Mixtures****Hazardous ingredients according to Regulation (EC) No 1272/2008**

| Component / CAS # | EC # | % | Classification |
|-----------------------------|-----------|---------|--|
| Ethylene Glycol 107-21-1 | 203-473-3 | 1-50 | H302, H373 |
| Methanol 67-56-1 | 200-659-6 | 0.1-10% | Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301 + H311 + H331, H370 |
| n-Butanol 71-36-3 | 200-751-6 | 0.1-10% | Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; STOT SE 3; H226, H302, H315, H318, H336, H335 Concentration limits: >= 20 %: STOT SE 3, H335; >= 20 %: STOT SE 3, H336; |

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

If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

Skin contact

Wash off with soap and plenty of water.

Eye contact

Flush eyes with water as a precaution.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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.

5.2 Special hazards arising from the substance or mixture

Burning releases carbon monoxide, carbon dioxide. In the event of fire and/or explosion do not breathe fumes. 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. See MSDS Section 8 (Exposure Controls/Personal Protection).

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 breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe 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. 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 without creating dust. 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. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Storage Temperature: Fridge, +4°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 parameters | Basis |
|-----------------|----------|---|----------------------------------|--|
| Ethylene glycol | 107-21-1 | STEL | 40 ppm 104 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 | | |
| | | TWA | 20 ppm 52 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 | 20 ppm 52 mg/m ³ | 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 | 40 ppm 104 mg/m ³ | 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. | | |
| | | TWA | 10 mg/m ³ | 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. Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used | | |
| | | TWA | 20 ppm 52 mg/m ³ | 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. | | |
| | | TWA | 10 mg/m ³ | 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 (Vapour) | 40 ppm 104 mg/m ³ | 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. | | |
| Methanol | 67-56-1 | TWA | 200 ppm 260 mg/m ³ | Europe. Indicative occupational exposure limit values |
| | Remarks | Identifies the possibility of significant uptake through the skin Indicative | | |
| | | TWA | 200 ppm 260 mg/m ³ | 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 | 250 ppm 333 mg/m ³ | 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. | | |
| n-Butanol | 71-36-3 | STEL | 50 ppm 154 mg/m ³ | UK. EH40 WEL - Workplace Exposure Limits |
| | Remarks | 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 particulerespirator 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-yellow |
| 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.

10.5 Incompatible materials

Strong oxidizing agents, Strong bases, Strong acids, Reducing agents, Acid chlorides, Acid anhydrides, Alkali metals.

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:

No data available

Skin corrosion/irritation:

No data available

Serious eye damage/eye irritation:

No data available

Respiratory or skin sensitization:

No data available

Germ cell mutagenicity:

No data available

Carcinogenicity

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:

No data available

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:

When ingested early symptoms mimic alcohol inebriation and are followed by nausea, vomiting, abdominal pain, weakness, muscle tenderness, respiratory failure, convulsions, cardiovascular collapse, pulmonary edema, hypocalcemic tetany, and severe metabolic acidosis. Without treatment, death may occur in 8 to 24 hours. Victims who survive the initial toxicity period usually develop renal failure along with brain and liver damage. Exposure to and/or consumption of alcohol may increase toxic effects. Central nervous system - Irregularities - Based on Human Evidence

drying, cracking of the skin, Skin irritation

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

No data available

Persistence and degradability

No data available

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

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

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

This safety datasheet complies with the requirements of Regulation (EC) No. 1272/2008.

15.2 Chemical Safety Assessment

no data available

SECTION 16: OTHER INFORMATION

Revision Date: 30-May-2019

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 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. 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

| | |
|--------------------|--|
| H301 + H311 + H331 | Toxic if swallowed, in contact with skin or if inhaled |
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H318 | Causes serious eye damage. |
| H335 | May cause respiratory irritation. |
| H336 | May cause drowsiness or dizziness. |
| H370 | Causes damage to organs. |
| H373 | May cause damage to organs (Kidney) through prolonged or repeated exposure if swallowed. |