

Product name: EM-Tec AG15 conductive silver paint
Document Nr.: SDS0015002115-01

Date: July 24th 2018
Version: 1.0

Section 1: Identification of the substance or mixture and the company

1.1. Product Identifier

EM-Tec AG15 conductive silver paint

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

Against electrostatic charge, bonding SEM samples and making grounding paths for SEM samples

1.3. Details of the supplier of the Safety Data Sheet

Vof Micro to Nano
Wateringweg 79
2031EK Haarlem
Netherlands
Tel: +31(0)85-2013155
E: info@microtonano.com

1.4 Emergency telephone number

112 (NLD) or your national emergency telephone number for chemical spills, leaks, fires, exposures or accidents

Section 2: Hazards identification

2.1. Classification of the substance or mixture

| | |
|-----------------------|---|
| Physical: | Flammable liquid, category 2 |
| Health: | Eye irritation, category 2 Single exposure category 3 May cause drowsiness or dizziness |
| Environment: | Chronic aquatic hazard category 1 |
| Other hazards: | None |

Classification according to Regulation EC Nr. 1272/2008

F: HIGHLY FLAMMABLE
Xi: Irritant
Xn: Harmful
Health: R36: Irritating to eyes
R22 Harmful if swallowed



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| | |
|-----------------------|---|
| Physical | R48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation |
| Environment: | R67: Vapours may cause drowsiness and dizziness R11: Highly flammable R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment |
| Other hazards: | Not classified |

2.2 Labeling elements

Labelling accordance to Regulation EC Nr. 1272/2008



Hazard pictogramm(s):

Signal word: Danger

Hazard statement(s):
H225: Highly flammable liquid and vapour
H302: Harmful if swallowed
H319: Causes serious eye irritation
H335: May cause respiratory irritation
H410: Very toxic to aquatic life with long lasting effects

Supplementary information: EUH066: Repeated exposure may cause dry skin or cracking

Precautionary statement(s)

Prevention:
P102: Keep out of reach of children
P201: Obtain special instructions before use
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P233: Keep container tightly closed
P240: Ground-bond container and receiving equipment
P241: Use explosion proof electrical/ventilating/lighting/intrinsically safe equipment
P242: Use only non-sparking tools
P243: Take precautions against static discharge
P260: Do not breathe mist/vapours/spray
P270: Do not eat, drink or smoke when using this product
P 271: Use outdoors or in well ventilated area (fume hood)



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Response:

P 273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection
P301+P312: If swallowed: Call a poison center/doctor/physician/first aider if you feel unwell
P370+P378: In case of fire: Use CO₂, dry chemical, or foam for extinction
P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical attention
P303+P361+P353: If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340: If inhaled: Remove person to fresh air and keep comfortable for breathing
P330: Rinse mouth
P362+P364: Take of contaminated clothing and wash before reuse
P391: Collect spillage

Storage: P403+P235: Store in a well-ventilated place. Keep cool
P405: Store locked up

Disposal: P501: Dispose of contents/container in accordance with local regulations

Supplemental hazard info: None

2.3 Other hazards

May produce discomfort of the respiratory system and skin
Cumulative effects may result following exposures
REACH + Art.57-59: The mixture does not contain Substances of Very High Concern (SVHC) at the SDS print date

Section 3: Composition / information on components

3.1. Substances

Not applicable

3.2 Mixtures

| 1. CAS Nr 2. EC Nr 3. REACH No | % (weight) | Name | Classification according to directive 67/548/EEC [DSD] | Classification according to regulation Nr 1272/2008 [CLP] |
|--------------------------------------|------------|----------------------|--|---|
| 108-10-1 203-550-1 | 25-50 | 4-Methylpentan-2-one | R11R66 | Flam. Liq. 2, Eye Irri. 2, Acute Tox. 4, STOT SE 3; H225, H319, |



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| | | | | |
|---|-----|--------|-----|--|
| 01-2119473980-30-xxxx | | | | H332, H335, EUH066 |
| 7440-22-4 231-131-3 not available | >25 | silver | R52 | Aquatic acute 1, Aquatic Chronic 1, H400, H410 |

(* Explanation notes: see section 16)

Section 4: First aid measures

4.1. Description of first aid measures

- Contact with eyes:** Rinse cautiously with water for several minutes. If possible, remove contact lenses. Continue rinsing.
 Seek medical attention if irritation persists.
- Contact with skin:** Wash with water and soap.
 Seek medical attention if irritation persists.
- Inhalation:** Fresh air, keep warm and at rest.
 Seek medical attention if ill effects occur
- Ingestion:** If swallowed, do not induce vomiting
 Seek immediate medical advice
 If vomiting appears imminent or occurs hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.
 Never give liquid to a person with reduced awareness
 Give water to rinse out mouth, then provide water slowly as much as casually can comfortably drink
 Avoid giving milk or oils
 Avoid giving alcohol

4.2. Important symptoms and effects, either immediate or delayed

- Inhalation:** Excessive inhalation of solvent vapours may give rise to nausea, blurred vision, fatigue, headaches and dizziness
- Ingestion:** May cause respiratory and digestive tract irritation
 Symptoms: sore throat, abdominal pain, nausea, vomiting
- Skin contact:** May cause skin irritation
 Symptoms: dry skin or cracking
- Eye contact:** Irritating to eyes
 Symptoms: redness and pain, impaired vision

4.3. Indication of any immediate medical attention and special treatment

- General advice:** If you feel unwell, seek medical advice; show product label if possible
 If symptoms persist, always call a doctor

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Section 5: Firefighting Measures

5.1. Extinguishing media

Use dry sand, graphite powder, dry sodium based extinguishers
Do not use water, CO₂, foam or halogenated fire extinguishing agents

5.2 Special hazards arising from the substance or mixture

Chemical reaction with CO₂ may produce flammable and explosive methane
Reacts with acids producing flammable / explosive hydrogen gas
Avoid exposure to oxidising agents

5.3 Advice to firefighters

Fight fire from a safe distance, with adequate cover
Metal dust fires may burn violently or may be explosively reactive
In case of fire; do not breathe fumes
Wear self-contained breathing apparatus for fire fighting

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Shut off all ignition sources
Do not allow metal dust or fine particles to accumulate
Ensure adequate ventilation
Wear suitable protective clothing including eye/face protection

6.2 Environmental precautions

Avoid release to the environment
Do not allow to enter public sewers and waterways

6.3 Methods and material for containment and clean up

Absorb spillage in suitable inert material
Clean up spills immediately
Avoid breathing vapours
Control personal contact with the substance, by using protective equipment
Collect spillage, absorbed spillage and wipes in a flammable waste container



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Wash spill area with soap and water to remove last traces of residue

6.4 Reference to other sections

For further information see section 8

Section 7: Handling and storage

7.1. Precautions for safe handling

- Keep away from sources of ignition
- Take precautions against static discharges
- Equipment should be grounded
- Use explosion proof electrical/ventilating/lighting/equipment
- Only use non-sparking tools
- Do not breathe aerosols or vapours
- Avoid accumulating of metal dust and fine particles
- Ensure adequate ventilation
- Avoid contact with skin and eyes
- Wash thoroughly after use
- Wear protective gloves/protective clothing/eye protection/face protection
- Have eyewash bottles available

7.2 Conditions for safe storage, including any incompatibilities

- Keep container tightly closed, in a cool, well ventilated place
- Keep away from ignition sources
- Store away from oxidising agents
- Keep cool
- Keep out of reach of children

7.3 Specific end uses(s)

- Against electro-static charge
- Making grounding paths.
- Bonding SEM specimens



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Section 8: Exposure control and personal protection

8.1. Control parameters

Exposure limits

Occupational exposure limits (OEL)

| Ingredient | Material Name | Source | TWA | STEL | Peak | Notes |
|----------------------|----------------------|--------|----------------------|-----------------------|---------------|---------------|
| 4-Methylpentan-2-one | 4-Methylpentan-2-one | UK | 208mg/m ³ | 208 mg/m ³ | Not available | Not available |
| Silver | Silver (metal) Ag | UK | 0.1mg/m ³ | Not available | Not available | Not available |

8.2 Exposure controls

- Control procedures:** Ensure adequate ventilation
Keep away from heat sources and ignition sources
Take precautions against static discharges
- Personal protection:** Take precautions to avoid contact with eyes and skin when handling the products
Ensure adequate ventilation
- Inhalation:** In case of insufficient ventilation, wear suitable respiratory equipment:
Air purifying respirator with organic gas/vapour cartridge (type A)
- Hands and skin:** Wear suitable gloves against chemicals; recommended gloves:
Nitrile
- Eyes:** Wear safety goggles or full-face protection

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

- Appearance/physical state:** Liquid
Colour: Silver
Odour: Solvent
pH not applicable
Boiling point/range: 56°C
Flash point: 14°C
Evaporation rate: not available
Explosion limits: upper limit: 8%
lower limit: 1.2%
Vapour pressure: No data available
Relative density: 1.63 g/cm³ @ 20°C



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Solubility in water: Insoluble
Auto-ignition: No data available
Viscosity: 250-500 mPa.s

9.2 Other information

VOC: 41.7%

Section 10: Stability and reactivity

10.1. Reactivity

Reaction with strong oxidants

10.2 Chemical stability

Stable at normal temperatures and pressures

10.3 Possibility of hazardous reactions

No hazardous reactions known if used for its intended purposes

10.4 Conditions to avoid

Avoid overheating, ignition sources and incompatible substances

10.5 Incompatible materials

Strong oxidising agents, strong acids

10.6 Hazardous decomposition products

Methane, hydrogen, CO, CO₂, nitrous oxides and smoke

Section 11: Toxicological information

11.1. Information on toxicological effects

Information on likely routes of exposure:

Inhalation: Inhalation of solvent vapours may cause respiratory irritation
Skin contact: Repeated exposure may cause dry skin or cracking
Eye contact: Causes serious eye irritation



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Toxicological data:

| Ingredient | Toxicity | Irritation |
|---|------------------------------|--------------------------|
| Silver, metal | Oral (rat) LD50: >2000 mg/kg | Not available |
| 4-Methylpentan-2-one | Dermal (rat) LD: >2000mg/kg | Eye: slightly irritating |
| | Inhalation (rat) LC50: 1 | Skin: not sensitising |
| | Oral (rat) LD50: 2080 mg/kg | |
| EM-Tec AG15 conductive silver coated copper paint | Not available | Not available |

Section 12: Ecological information

12.1. Toxicity

Not available

12.2 Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|----------------------|-------------------------|------------------|
| 4-Methylpentan-2-one | LOW | LOW |

12.3 Bioaccumulative potential

| Ingredient | Bioaccumulation |
|----------------------|---------------------|
| 4-Methylpentan-2-one | LOW (LogKOW = 1.31) |

12.4 Mobility in soil

| Ingredient | Bioaccumulation |
|----------------------|-----------------|
| 4-Methylpentan-2-one | HIGH |

12.5 Results of PBT and vPvB assessment

No information available

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12.6 Hazardous decomposition products

No experimental data available

Section 13: Disposal considerations

13.1. Waste treatment methods

Product: This material and its container must be disposed of in a safe way. Containers may still present a chemical hazard when empty. Do not discharge into drains or the environment, dispose to an authorised waste collection point.

National regulations: Disposal should be in accordance with local, state or national legislation.

Section 14: Transport information

Labels required:



14.1. UN number

UN-number: 1263

14.2 UN proper shipping name

Proper shipping name: PAINT

14.3 Transport hazard class(es)

Class: 3
ADR/RID-Classification code: F1

14.4 Packing group

Packing: II
Limited Quantity: 5L

14.5 Incompatible materials



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ADR/RID- Environmentally hazardous: Not applicable
IMDG-Marine pollutant: No relevant data
IATA/ICAO-Environmentally hazardous:No relevant data

14.6 Special precautions for user

ADR/RID-Tunnel code: (D/E)
IMDG-EMS: F-E, S-E
IATA/ICAO-PAX: 353
IATA/ICAO-CAO: 364
IATA/ICAO-DGR: Y341

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC code

Not applicable

Section 15: Regulatory information

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

UN-number: 1263

15.2 Chemical safety assessment

No information available

Section 16: Other information

RoHS Directive Compliant

This product is fully compliant with the directive 2100/65/EU Annex II (RoHS). It does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's or PBDE's.

WEEE

This product is not a piece of electrical or electronic equipment, and it therefore not governed by Directive 2002/96/EC on waste electrical and electronic equipment (WEEE)

Abbreviations:

| | |
|----------|---|
| Asp. Tox | Aspiration hazard |
| Carc. | Carcinogenicity |
| Exp. | Exposure |
| Flam. | Flammable |
| GHS | Global Harmonised System of Classification of Labelling Chemicals |
| Irrit. | Irritant |



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| | |
|-------|---|
| LC50 | Lethal Concentration 50% |
| LCLo | Lowest published lethal concentration |
| LD50 | Lethal Dose 50% |
| N/A | Not applicable |
| N/E | Not estimated |
| PBT | Persistent Bioaccumulative and Toxic |
| WEL | Workplace Exposure Limit |
| Repr. | Reproductive toxicant |
| RoHS | Restriction of Hazardous Substance |
| SEM | Scanning Electron Microscope |
| STEL | Short-Term Exposure Limit |
| STOT | Specific Target Organ Toxicity |
| TCLo | Lowest published toxic concentration |
| vPvB | very Persistent and very Bioaccumulative |
| WEEE | Waste Electrical and Electronic Equipment |

Full Text Risk and Hazard codes

H225- Highly flammable liquid and vapour
H226 – Flammable liquid and vapour.
H228 – Flammable solid
H302 – Harmful if swallowed.
H312 – Harmful in contact with skin.
H314 – Causes severe skin burns and eye damage.
H317 – May cause an allergic skin reaction.
H319 – Causes serious eye irritation
H332 – Harmful if inhaled.
H334 – May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335 – May cause respiratory irritation.
H340 – May cause genetic defects.
H351 – Suspected of causing cancer.
H360 – May damage fertility or the unborn child.
H370 – Causes damages to organs.
H371 – May cause damage to organs.
H372 – Causes damage to organs through prolonged or repeated exposure.
H400 – Very toxic to aquatic life.
H410 – Very toxic to aquatic life with long lasting effects.
H411 – Toxic to aquatic life with long lasting effects.
H413 – May cause long lasting harmful effects to aquatic life.

R10 – Flammable.
R20- Harmful by inhalation.
R20/22 – Harmful by inhalation and if swallowed.
R36 – Irritating to eyes.
R37 – Irritating respiratory system.



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- R38 – Irritating to skin.
- R52 – Harmful to aquatic organisms
- R63 – Possible risk of harm to the unborn child.
- R65 – Harmful – May cause long damage if swallowed
- R66 – Repeated exposure may cause skin dryness and cracking.

Safety advice:

- S02 – Keep out of reach of children.
- S09 – Keep container in a well-ventilated place.
- S13 – Keep away from food, drinks, and animal feeding stuff.
- S16 – Keep away from sources of ignition. No smoking.
- S23 – Do not breath gas/fumes/vapour/spray.
- S26 – In case of contact with eyes, rinse with plenty of water and seek medical help.
- S281 – After contact with skin, wash immediately with detergent and plenty of waterways.
- S29 – Do not empty in drains.
- S33 – Take precautionary measures against static discharges.
- S35 – This material and its container must be disposed of in a safe way.
- S36 – Wear suitable protective clothing.
- S37 – Wear suitable gloves.
- S38 – In case of insufficient ventilation, wear suitable respiratory equipment.
- S39 - Wear eye / face protection.
- S40 – In case of insufficient ventilation, wear suitable respiratory equipment.
- S41 – In case of fire and/or explosion; DO NOT breathe fumes.
- S43 – In case of fire use....
- S45 – In case of accident or if you feel unwell, immediately contact Doctor or Poisons information center (show label if possible).
- S46 – If swallowed, seek immediate medical advice and show label if possible.
- S52 – Not recommended for interior use on large surfaces.
- S53 – Avoid exposure – obtain special instructions before use.
- S56 – Dispose of this material and its container at hazardous or special waste collection point.
- S57 – Use appropriate container to avoid environment contamination.
- S61 – Avoid release to the environment
- S63 – In case of accident by inhalation, remove casualty to fresh air and keep at rest.
- S64 – If swallowed, rinse mouth with water (only if person is conscious)

This product should be stored, handled, and used in accordance with good industrial hygiene practices and in accordance with any legal regulation.

The information contained herewith is based on the present state of our knowledge and is intended to describe the product from the point of view of safety requirements. It does not guarantee any specific properties.

It is the responsibility of the user to query and verify any information seeming suspect or where doubt on the validity may exist. The buyer assumes all responsibility of using and handling the product in accordance with local, state, federal and international regulations.



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