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

1.1. Product Identifier

EM-Tec C20 conductive carbon pen with micro tip

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

For making grounding paths on SEM samples, repairing traces on circuit boards, making contact pads.

1.3. Details of the supplier of the Safety Data Sheet

Micro to Nano VOF Tappersweg 91 2031ET 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:** May cause drowsiness or dizziness

Serious eye irritation category 1
Skin sensitizer category 1

Suspected of causing cancer

Specific organ

Environment: Not appplicable

Other hazards: None



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Classification according to Regulation EC Nr. 1272/2008

F: HIGHLY FLAMMABLE

Xi: Irritant Xn: Harmful

Health: R36: Irritating to eyes

R38: Irritating to skin

R48: Danger of serious damage to health by prolonge exposure

R67: Vapours may cause drowsiness and dizziness

Physical R11: Highly flammable

Environment: Not classified **Other hazards:** Not classified

2.2 Labeling elements

Labelling accordance to Regulation EC Nr. 1272/2008

Hazard pictogram(s):









Signal word: Danger

Hazard statement(s): H225: Highly flammable liquid and vapour

H317: May cause an allergic skin reaction

H318: Causes serious eye damage

H336: May cause drowsiness or dizziness

H351: Suspected of causing cancer

EUH066:Repated exposure may causes skin dryness 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

P240: Ground and bond container and receiving equipment

P241: Use explosion proof electrical/ventilating/lighting/intrinsically safe

Equipment

P242: Use non-sparking tools

P243: Take action to prevent static discharges P261: Avoid breathing mist/vapours/spray



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P264: Wash all exposed external body areas thouroughly after handling

P270: Do not eat, drink, or smoke when using this product P 271: Use only outdoors or in well ventilated area (fume hood)

P272: Contaminated work clothing should not be allowed out of the work

place

P 273: Avoid release to the environment

P280: Wear protective gloves/protective clothing/eye protection/face

protection

Response: P308+P313: If exposed or concerned: Get medical attention

P312: Call a poison center/doctor/physician/first aider if you feel unwell

P370+378: In case of fire: Use alcohol resistant foam or protein foam for extinction

extinction

P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes. Remove

contact lenses if easy to do. Continue rinsing.

P333+P313: If skin irritation or rash occurs: Get medical advice/attention

P337+P313: If eye irritation persists: Get medical attention P302+P352: If on skin: Wash with plenty of water and soap.

P304+P340: If inhaled: Remove person to fresh air and keep comfortable for

breathing

P303+P361+P353: If on skin (or hair): Take off immediately all contaminated clothing.

Rinse with water (or shower)

P362+P364: Take off contaminated clothing and wash it before use

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 to local/regional/

international regulations

Supplemental hazard info: none

2.3 Other hazards

Inhalation may produce health damage Cumulative effects may result following exposure May produce discomfort of the respiratory system

Section 3: Composition / information on components

3.1. Substances

Not applicable



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3.2 Mixtures

| 1. CAS Nr 2. EC Nr 3. Index Nr 4. REACH No | % (weight) | Name | Classification according to directive 67/548/EEC [DSD] | Classification according to regulation Nr 1272/2008 [CLP] |
|--|------------|--|---|---|
| 67-64-1 200-662-2 606-001-00-8 01-2119471330-49-xxxx | 36 | acetone | R11R36R66R67 | Flam. Liq. 2, Eye Irri. 2, STOT SE 3; H225, H319, H336, EUH066 |
| 110-19-0 203-745-1 607-026-00-7 01-2119488971-22-xxxx | 30 | Isobutyl acetate | R11 | Flammable liquid 2: H225. EUH066 |
| 71-63-3 200-751-6 603-004-00-6 01-2120076484-50-xxxx | 10 | n-butanol | R11R36R66R67 | Flam. Liq. 3, Acute Tox, 4; H226, H302, H335, H315, H318, H336 |
| 1333-86-4 215-609-9 422-130-0 Not available 01-2119384822-32-xxxx | 6 | Carbon black | R11R36R66R67 | Flam. Liq. 2, Eye Irri. 2, STOT SE 3; H225, H319, H336, EUH066 |
| 108-65-6 203-603-9 607-195-00-7 Not available | 4 | Propylene glycol monomethyl ether acetate alpha isomer | R10 | Flam. Liq. 3; H226 |
| 25619-56-1 247-132-7 Not available Not available | 0.5 | Barium dinonyl naphtalenesulfonate | R36R38R48 | Acute Tox.4, Skin Irr. 2, Ser. Eye Dam 1; H302+H332, H315, H318 |

^{(*} Explanation notes: see section 16)

Section 4: First aid measures



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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 of 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 cough, drowsiness,

headaches, and dizziness

Ingestion: May cause respiratory and digestive tract irritation

Symptoms: sore throat, abdominal pain, nausea, vomiting

Skin contact: Mildly irritating to skin

Symptoms: redness, irritation and dry skin

Eye contact: Irritating to eyes

Symptoms: redness, irritation 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

Section 5: Firefighting Measures

5.1. Extinguishing media

Alcohol stable foam, dry chemical powder, CO2



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Water spray or fog – Large fires only

5.2 Special hazards arising from the substance or mixture

The vapours are heavier than air and may accumulate in low-lying areas Produces CO and CO2

5.3 Advice to firefighters

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
Avoid breathing fumes/vapours
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
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



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Section 7: Handling and storage

7.1. Precautions for safe handling

Keep out of reach of children

Keep away from sources of ignition

Do not breathe aerosols or vapours

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 Store locked up

Keep cool

7.3 Specific end uses(s)

Making grounding paths for SEM samples Repairing traces on circuit boards Making contact pads

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 |
|------------|---------------|--------|-----------|-----------|---------------|---------------|
| Acetone | Acetone | UK | 1210mg/m3 | 3620mg/m3 | Not available | Not available |



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| | | EU | 1210mg/m3 | Not available | Not available | Not available |
|--|------------------|----|---------------|---------------|---------------|---------------|
| Isobutyl acetate | Isobutyl acetate | UK | 724mg/m3 | 903mg/m3 | Not available | Not available |
| | | EU | Not available | Not available | Not available | Not available |
| n-butanol | Butan-1-0l | UK | Not available | 154mg/m3 | Not available | Skin |
| | | EU | Not available | Not available | Not available | Not available |
| Carbon black | Carbon black | UK | 3.5mg/m3 | 7mg/m3 | Not available | Not available |
| | | EU | 3.5mg/m3 | 7mg/m3 | Not available | Not available |
| Propylene glycol | 1-Methoxypropyl | UK | 274mg/m3 | 548mg/m3 | Not available | Skin |
| monomethyl ether acetate, alpha isomer | -2-acetate | EU | 275mg/m3 | 550mg/m3 | Not available | Skin |

8.2 Exposure controls

Control procedures: Ensure adequate ventilation

Keep away from heat sources and ignition sources

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:** Black

Odour:Not availableOdour threshold:5 ppmpHNot available

Boiling point/range: 56°C

Flash point: -17°C (closed cup)
Evaporation rate: Not available



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Flammability: Highly flammable

Explosion limits: upper limit: 12%

lower limit: 2%

Vapour pressure: Not available

Vapour density: >2

Relative density: 1.7 g/cm3 @ 20°C Solubility in water: partly miscible

Auto-ignition: 465°C **Viscosity:** 128.090 cSt

9.2 Other information

VOC: Not available

Section 10: Stability and reactivity

10.1. Reactivity

No hazardous reactions known if used for its intended purposes

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, strong bases

10.6 Hazardous decomposition products



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CO, CO2 and smoke

Section 11: Toxicological information

11.1. Information on toxicological effects

Information on likely routes of exposure:

Inhalation: Inhalation of solvent vapours may give rise to nausea, headaches and dizziness

Ingestion: Not classified as harmful by ingestion

Skin contact: Not thought to have harmful health effects, the material may still produce health damage

following entry through wounds, lesions or abrasions

Eye contact: Irritation to eyes

Toxicological data:

| Ingredient | Toxicity | Irritation |
|-----------------------------------|---------------------------------|-----------------------------------|
| Acetone | Not available | Eye (human): 500ppm - irritant |
| | | Eye (rabbit): 20mg/24h - moderate |
| | | Skin (rabbit): 500mg/24hr - mild |
| isobutyl acetate | Dermal (tabbit) LD50: 5000mg/kg | |
| | Oral (rat) LD50: 13400mg/kg | Skin (rabbit): 500mg - mild |
| n-butanol | Dermal(rabbit) LD50: 3400mg/kg | Eye (rabbit): 1.6mg - severe |
| | Inhalation (rat) LC50: 24mg/L4h | Skin (rabbit): 405 mg - moderate |
| | Oral (rat) LD50: 790mg/kg | |
| Carbon black | Dermal (rat) LD50: 2000mg/kg | Eye: no adverse effects observed |
| | Oral(rat) LD50: 15400 mg/kg | Skin: No adverse effects observed |
| Propylene glycol monomethyl ether | Dermal(rat) LD50: 2000mg/kg | Eye: no adverse effects observed |
| acetate, alpha-isomer | Inhalation(rat)LC50: 6.5mg/L/6h | Skin: No adverse effects observed |
| | Oral (rat) LD50: 5155mg/kg | |
| Barium dionyl naphtalenesulfonate | Dermal (rabbit) LD50: 2000mg/kg | Eye(rabbit): 250mg/5d - mild |



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| | Inhalation (rat) LC50: 5.25mg/l/1H | |
|----------------------------------|------------------------------------|---------------|
| | Oral (rat) LD50: 3000mg/kg | |
| EM-Tec C20 conductive carbon pen | Not available | Not available |

Section 12: Ecological information

12.1. Toxicity

Not available

12.2 Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|---|---------------------------|----------------------------------|
| acetone | LOW (Half-life = 14 days) | Medium (Half-life = 116.25 days) |
| isobutyl acetate | LOW | LOW |
| n-butanol | LOW (Half-life = 54 days) | LOW (Half-life = 3.65 days) |
| Propylene glycol monomethyl ether acetate, alpha isomer | LOW | LOW |

12.3 Bioaccumulative potential

| Ingredient | Bioaccumulation |
|---|---------------------|
| acetone | LOW (BCF = 69) |
| Isobutyl acetate | LOW (LogKOW = 1.78) |
| n-butanol | LOW (BCF = 0.64) |
| Propylene glycol monomethyl ether acetate, alpha isomer | LOW (logKOW = 0.56) |

12.4 Mobility in soil

| Ingredient | Bioaccumulation | |
|------------|-------------------|--|
| acetone | HIGH(KOC = 1.981) | |



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| Isobutyl acetate | LOW (KOC = 17.48) |
|---|----------------------|
| n-butanol | MEDIUM (KOC = 2.443) |
| Propylene glycol monomethyl ether acetate, alpha isomer | HIGH (KOC = 1.838) |

12.5 Results of PBT and vPvB assessment

No information available

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:



Excepted Quantity

Code E2 for all modes of transport
On air waybill, write "Dangerous goods in excepted quantity"

14.1. UN number



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UN-number: 1263

14.2 UN proper shipping name

Proper shipping name: PAINT or PAINT RELATED MATERIAL

14.3 Transport hazard class(es)

Class: 3 ADR/RID-Classification code: F1

14.4 Packing group

Packing: Ш **Limited Quantity** 5L

14.5 Incompatible materials

ADR/RID- Environmentally hazardous: Not applicable

IMDG-Marine poluttant: Yes

IATA/ICAO-Environmentally hazardous: No relevant data

14.6 Special precautions for user

ADR/RID-Tunnelcode: (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



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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

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 toxitant

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

DSD / DPD label elements



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Full Text Risk and Hazard codes

H225: Highly flammable liquid and vapour

H226: Flammable liquid and vapour

H302: Harmful if swallowed H315: Causes skin irritation

H317: May cause an allergic skin reaction

H318: Causes serious eye damage

H319: Causes serious eye irritation

H335: May cause respiratory irritation

H336: May cause drowsiness or dizziness

H351: Suspected of causing cancer

H372: Causes damage to organs through prolonged or repeated exposure

EUH066: Repated exposure may causes skin dryness or cracking

R36: Irritating to eyes

R38: Irritating to skin

R48: Danger of serious damage to health by prolonge exposure

R67: Vapours may cause drowsiness and dizziness

R11: Highly flammable

R52: Harmful to aquatic organisms

Safety advice:

- S02 Keep out of reach of children.
- S09 Keep container in a well-ventilated place.
- S13 Keep away from food, drink and animal feeding stuff.
- \$16 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.



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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.

