

SAFETY DATA SHEET

Creation Date 13-Aug-2019

Revision Date 10-Feb-2023

SECTION 1: Identification

Product Name: HSQ Electron Beam Resist
Identified Uses: Negative tone electron beam resist
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SECTION 2: Hazards identification

Classification

| | |
|-----------------------------------|-----------------------------------|
| Flammable liquids | (Category 2) |
| Acute toxicity, Inhalation | (Category 4) |
| Serious eye damage/eye irritation | (Category 2A) |
| Carcinogenicity | (Category 2) |
| Specific target organ toxicity | (Category 3) (respiratory system) |

Label Elements

Pictogram



Signal Word

Danger

Hazard statement(s) :

H225 Highly Flammable liquid and vapour
H319 Causes serious eye irritation
H332 Harmful if inhaled

Precautionary statement(s):

P210 Keep away from heat/sparks/open flames/hot surfaces – No smoking
P261 Avoid breathing dust/fume/gas/mist/vapours/spray
P280 Wear protective gloves/protective clothing

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| H335 | May cause respiratory irritation | P303 + P361 + P353 | IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. |
| H351 | Suspected of causing cancer if inhaled | P271 P233 P240 P241 P242 P243 P264 P305 + P351 + P338 P312 P337 + P313 P370 + P378 P403 | Use only outdoors or in a well-ventilated area. Keep container tightly closed Ground/bond container and receiving equipment Use explosion proof electrical, lighting, ventilation equipment Use only non-sparking tools Take precautionary measures against static discharge Wash exposed skin thoroughly after handling If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a POISON CENTRE or doctor/physician if you feel unwell If eye irritation persists: Get medical advice/attention In case of fire: Use CO ₂ , dry chemical or foam for extinction. Store in a well-ventilated place. Keep container tightly closed |

SECTION 3: Composition / information on ingredients

| Component | Classification | Concentration (Weight %) |
|---|--|--------------------------|
| Methyl isobutyl ketone CAS: 108-10-1 | Flam. Liq. 2; Acute Tox. 4; Eye Irrit. 2A; STOT SE 3; H225, H319, H332, H335 | 80-99% |
| Hydrogen silsesquioxane | Not Classified | 1-20% |

SECTION 4: First-aid measures

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| Eye Contact | Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention if irritation persists. |
| Skin Contact | Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if irritation persists. |
| Inhalation | Move to fresh air. If breathing is difficult give oxygen. Get medical attention if symptoms occur. |

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| Ingestion | Do not induce vomiting. Give lots of water to drink. Obtain medical attention |
| Most important symptoms/effects | Breathing difficulties. Symptoms of overexposure may be headaches, dizziness, tiredness, nausea and vomiting. |

SECTION 5: Fire-fighting measures

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| Suitable Extinguishing Media | User water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray. |
| Flash Point | 14°C / 57.2°F |
| Autoignition Temperature | 460°C / 860°F |
| Specific Hazards Arising from the Chemical | Flammable. Risk of ignition. Vapours may form explosive mixtures with air. Vapours may travel to source of ignition and flash back. Thermal decomposition can lead to release of irritating gases and vapours. Keep product and empty container away from heat and sources of ignition. |
| Hazardous Combustion Products | No hazardous combustion products are known |
| Protective Equipment and Precautions for Firefighters | As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear |

SECTION 6: Accidental release measures

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| Personal Precautions | Use personal protective equipment as required. Remove all sources of ignition. Ensure adequate ventilation. Take precautionary measures against static discharges. Avoid contact with skin, eyes and clothing |
| Environmental Precautions | Avoid release to the environment |
| Methods for Containment and Clean Up | Remove all sources of ignition. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Use spark-proof tools and explosion-proof equipment |

SECTION 7: Handling and storage

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| Handling | Wear personal protective equipment. Keep away from open flames, hot surfaces and sources of ignition. Ensure adequate ventilation. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharge. Avoid contact with skin, eyes and clothing |
|-----------------|--|

Storage

Keep containers tightly closed in a dry, cool and well ventilated place. Keep away from heat and sources of ignition.
Flammables areas

SECTION 8: Exposure controls/personal protection**Exposure Guidelines:**

| Component | ACGIH TLV | OSHA PEL | NIOSH IDLH | ACGIH STEL |
|---|-------------|--------------|------------|-------------|
| Methyl isobutyl ketone (CAS: 108-10-1) | TWA: 20 ppm | TWA: 100 ppm | - | TWA: 75 ppm |

Engineering Measures

Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment.
Ensure that eyewash stations and safety showers are close to the workstation location

**Personal Protective Equipment
Eye/face Protection**

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice

SECTION 9: Physical and chemical properties

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|---------------------|--------------------------|
| Physical State | Liquid |
| Appearance | Colorless |
| Odor | Alcoholic Ketone |
| Odor Threshold | No Information available |
| pH | No Information available |
| Melting Point/Range | No Information available |
| Boiling Point/Range | 117°C / 243°F @ 760 mmHg |
| Flash Point | 14°C / 57°F |

| | |
|--|------------------------------|
| Evaporation Rate | No information available |
| Flammability (solid,gas) | Not applicable |
| Flammability or explosive limits | |
| Upper | 8.0 vol % |
| Lower | 1.2 vol % |
| Vapor Pressure | No Information available |
| Vapor Density | No Information available |
| Relative Density | 0.80 |
| Solubility | Moderate solubility in water |
| Autoignition Temperature | 460°C / 860°F |
| Decomposition Temperature | No information available |
| Partition coefficient: n-octanol/water | No information available |
| Viscosity | No information available |

SECTION 10: Stability and reactivity

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| Reactive Hazard | Vapours may form explosive mixture with air |
| Stability | Stable under normal conditions |
| Conditions to avoid | Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition |
| Incompatible Materials | Strong oxidising agents |
| Hazardous Decomposition Products | None known |
| Hazardous Polymerisation | Hazardous polymerisation does not occur |
| Hazardous Reactions | May form explosive peroxides |

SECTION 11: Toxicological information

Acute Toxicity

Product Information

Component Information

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|------------------------|-------------------|----------------------|------------------------|
| Methyl isobutyl ketone | >2000 mg/kg (Rat) | >2000 mg/kg (Rabbit) | >10 - 20 mg/L (Rat) 4h |

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| Toxicologically Synergistic Products | No information available |
|--------------------------------------|--------------------------|

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as carcinogenic

| Component | CAS No. | IARC | NTP | ACGIH | OSHA | Mexico |
|-----------------------|----------|----------|------------|-------|------|--------|
| Methylisobutyl ketone | 108-10-1 | Group 2B | Not listed | A3 | x | A3 |

Mutagenic Effects No information available

Reproductive Effects No information available

Developmental Effects No information available

Teratogenicity No information available

STOT – single exposure Central nervous system (CNS)

STOT – repeated exposure Liver, Kidney

Aspiration hazard No information available

Symptoms/effects, both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea, and vomiting

Endocrine Disruptor Information No information available

SECTION 12: Ecological Information

Ecotoxicity

Do not empty into drains

| Component | Freshwater Algae | Freshwater fish | Microtox | Water Flea |
|------------------------|--------------------|--|-----------------------|--|
| Methyl isobutyl ketone | EC50: 400 mg/L/96h | LC50: 496 – 514 mg/L, 96h flow through (Pimephales promelas) | EC50 = 79.6 mg/L 5min | EC50: 4280.0 mg/L/24h EC50: 170 mg/L/48h EC50: 4280 mg/L/24h |

BOD5 and COD Not available

Products of Biodegradation Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation The products of degradation are more toxic.

Special remarks on the Products of Biodegradation Not available

SECTION 13: Disposal Considerations

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| Product | 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

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|------------------------------|------------------------|
| UN-No | UN1245 |
| Proper Shipping Name | Methyl isobutyl ketone |
| Hazard Class | 3 |
| Packing Group | II |
| Environmental Hazards | None |

SECTION 15: Regulatory information

REACH Regulation (EC) No 1907/2006

This product contains only components that have been either pre-registered, registered, are exempt from registration, are regarded as registered or are not subject to registration according to Regulation (EC) No. 1907/2006 (REACH)., Polymers are exempted from registration under REACH. All relevant starting materials and additives have been either pre-registered, registered, or are exempt from registration to Regulation (EC) No. 1907/2006 (REACH)., The aforementioned indications of the REACH registration status are provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. It is the buyer's/user's responsibility to ensure that his/her understanding of the regulatory status of this product is correct.

SECTION 16: Other information

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|-------------------------|---|
| Prepared By | EM Resist Ltd. |
| Creation Date | 10-Jan-2019 |
| Revision Date | 10-Feb-2023 |
| Revision Summary | This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) Updated contact details |

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.