

Safety Data Sheet



Product name:

Moleculite®

Safety Data Ref: 6
Initial issue date: 09 Jun 2013
Revision date: 03 Mar 2020
Version number: 17

| Section 1 | | IDENTIFICATION OF SUBSTANCE / PREPARATION AND OF THE COMPANY |
|-----------|----------------------------|---|
| 1.1 | Product identifier | |
| 1.11 | Product name | Moleculite (the reaction mass of copper oxide and manganese dioxide) |
| 1.12 | Relevant use(s)/misuse(s) | As a remover of contaminants from breathable gases by catalytic oxidation |
| 1.13 | SDS supplier | Molecular Products Ltd, Parkway, Harlow Business Park, Harlow, Essex, CM19 5FR, UK |
| 1.14 | Emergency contact (global) | +44 (0) 1279 445111 (office hours) / +44 (0)1865 407333 (out of hours, English speaking) sds@molprod.com (email) |
| 1.14.1 | Emergency contact (other) | China (NRCC) 0532 8388 9090, Mexico: +52 555 004 8763, Chile: +56 225 829 336, Brazil: +55 11 3197 5891 |

| Section 2 | | HAZARDS IDENTIFICATION | | | |
|-----------|---|---|-------------------|-------------|---------|
| 2.1 | Classification of the substance or mixture | | | | |
| 2.1.1 | Classification according to Regulation (EC) No 1272/2008 (CLP/GHS) | | | | |
| | Acute Tox. 4 | H302 | Aquatic Acute 1 | H400 | |
| | Acute Tox. 4 | H332 | Aquatic Chronic 1 | H410 | |
| | STOT RE. .2 | H373 | | | |
| 2.1.2 | See section 16 for full text of H statements | | | | |
| 2.2 | Labelling elements | | | | |
| 2.2.1 | Labelling in accordance with EC Regulation No 1272/2008 (CLP/GHS) | | | | |
| | Pictogram | | | Signal word | WARNING |
| | Hazard statements | | | | |
| | * Please note that the Moleculite is encased within the Hi-Cap and Marcisorb CO Absorber units and only minimal amounts of dust will be present when in use. | | | | |
| | H302 | Harmful if swallowed | | | |
| | H332 | Harmful if inhaled | | | |
| | H373 | May cause damage to organs through prolonged or repeated exposure via inhalation * | | | |
| | H400 | Very toxic to aquatic life | | | |
| | H410 | Very toxic to aquatic life with long lasting effects | | | |
| | Precautionary statements | | | | |
| | P260 | Do not breathe dust/fume/gas/mist/vapours/spray | | | |
| | P264 | Wash hands and skin thoroughly after handling | | | |
| | P270 | Do not eat, drink or smoke when using this product | | | |
| | P271 | Use only outdoors or in a well-ventilated area | | | |
| | P273 | Avoid release into the environment | | | |
| | P312 | Call a POISON CENTER or doctor/physician if you feel unwell | | | |
| | P304/340 | IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing | | | |
| | P314 | Get medical attention if you feel unwell | | | |
| | P330 | Rinse mouth | | | |
| | P501 | Dispose of contents/container to authorised recipient of hazardous waste | | | |
| 2.3 | Other hazards | | | | |
| | The product does not meet the PBT or vPvB criteria. The criteria of Annex XIII to the Regulation 1907/2008/EC (PBT or vPvB) does not apply to inorganic substances | | | | |

| Section 3 COMPOSITION / INFORMATION ON INGREDIENTS | | | | | |
|--|---------------------------|-------------------------|---------------|--|---------------|
| | Chemical characterisation | Transition metal oxides | | | |
| | Chemical name | CAS number | EINECS/ELINCS | Classification | Concentration |
| | Manganese Dioxide | 1313-13-9 | 215-202-6 | CLP: Acute Tox 4 H332; Acute Tox 4 H302 STOT RE 2; H373 (brain) (inhalation) | 60-80% |
| | Copper oxide | 1317-38-0 | 215-269-1 | CLP: Aquatic Acute 1 H400; Aquatic Chronic 1 H410 (see section 12) | ≤40% |

| Section 4 FIRST AID MEASURES | | |
|------------------------------|--|---|
| 4.1 | Description of measures | |
| | Inhalation | Remove casualty to fresh air and provide warmth and rest. Seek medical attention if you feel unwell |
| | Skin contact | Immediately remove contaminated clothing. Flush contaminated skin with plenty of water with soap and more water. Seek medical advice if necessary |
| | Eye contact | Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Avoid strong stream of water due to the risk of mechanical damage to the cornea. Seek medical advice if necessary |
| | Ingestion | Do NOT induce vomiting. Rinse mouth out with water and then drink plenty of water. Seek medical advice if necessary |
| 4.2 | Most important effects/symptoms both acute and delayed | |
| | Inhalation | Persons exposed to high levels of the product are susceptible to respiratory diseases. The repeated inhalation of dust may cause damage to the central nervous system. Harmful if inhaled |
| | Eye contact | Significant concentrations of dust or direct ingress of substances into the eyes may cause irritation, redness, tearing, burning and conjunctivitis |
| | Skin contact | May cause irritation, redness, dryness, itching and inflammation |
| | Ingestion | May cause irritation of the mucous membrane of the digestive tract and stomach, nausea, vomiting diarrhoea and stomach pain. Harmful if swallowed |
| 4.3 | Immediate/special treatment | |
| | | Remove affected person from the contaminated product. In the event of health problems, immediately consult your doctor or a centre of toxicological concern. Provide the information contained in the SDS. If unconscious do not give anything by mouth |

| Section 5 FIRE FIGHTING MEASURES | | |
|----------------------------------|--------------------------|--|
| 5.1 | Extinguishing media | To suit local surroundings (e.g. chemical powder, carbon dioxide and dry sand). |
| | Unsuitable media | Water jet |
| 5.2 | Special hazards | Avoid inhalation of combustion products |
| 5.3 | Advice for fire fighters | Wear full protective equipment and self-contained breathing apparatus. If containers are exposed to high temperatures cool with water and if possible remove from area. Take up mechanically. Keep out of drains, surface water and soil. Place water waste in containers and dispose of contents/container to authorised recipient of hazardous waste |

| Section 6 ACCIDENTAL RELEASE MEASURES | | |
|---------------------------------------|---------------------------------------|--|
| 6.1 | Personal precautions | Adhere to personal protective measures. Avoid inhalation of dust |
| 6.2 | Environmental precautions | Do not allow to get into waste water or waterways; if this occurs, inform the relevant water authority at once |
| 6.3 | Methods and materials for cleaning up | In the event of spillage, take up mechanically avoiding the formation of dust (e.g. sweep or vacuum up) into tightly closed containers. Label container and dispose of contents/container to authorised recipient of hazardous waste |
| 6.4 | Reference to other sections | See section 8 for personal protective equipment |

| Section 7 HANDLING AND STORAGE | | |
|--------------------------------|-------------------------------|---|
| 7.1 | Precautions for safe handling | Handle in accordance with good hygiene and safety practice. Avoid the raising and deposition of dust |
| 7.2 | Conditions for safe storage | Ensure adequate ventilation of the storage area. Keep containers tightly closed, cool and dry, avoiding direct sunlight |
| 7.3 | Specific end use(s) | As a remover of contaminants from breathable gases and as a catalyst |

| Section 8 | | EXPOSURE CONTROLS / PERSONAL PROTECTION | | | |
|-----------|--|--|-----|-------------------|---|
| 8.1 | Workplace Exposure Limits (WELs) have been assigned by the HSE (EH40/2005) | | | | |
| | LTEL (8 hour TWA) | ppm | 0.5 | mg/m ³ | Data for manganese and its inorganic compounds (EH40/2005), third edition, published 2018 |
| | LTEL (8 hour TWA) | ppm | 1.0 | mg/m ³ | Data for copper and its inorganic compounds (EH40/2005), third edition, published 2018 |
| | LTEL (8 hour TWA) | ppm | 0.2 | mg/m ³ | Data for copper fume (as Cu) (EH40/2005), third edition, published 2018 |
| | Legal basis: Ordinance on maximum permissible concentration and intensity of harmful factors in the work environment in accordance with national limit values. EH40/2005 Work place exposure limits, third edition, published 2018 | | | | |
| | Use methods described un the European standards | | | | |
| | Systemic effects, inhalation exposure for employees DNEL _{long term} : 160µg/m ³ | | | | |
| | Systemic effects, skin exposure for employees DNEL _{long term} : 4.5mg/kg b.w./day | | | | |
| | Systemic effects, inhalation exposure for general public DNEL _{long term} : 20µm/m ³ | | | | |
| | Systemic effects, skin exposure for general public DNEL _{long term} : 2.25 mg/kg b.w./day | | | | |
| | Systemic effects, oral exposure for general public DNEL _{long term} : 0.23mg/kg b.w./day | | | | |
| | PNEC _{fresh water} : 7.8 µg/L | | | | |
| | PNEC _{marine water} : 0.78 µg/L | | | | |
| | PNEC _{sediment (fresh water)} : 87 mg/kg | | | | |
| | PNEC _{sediment (marine water)} : 8.7 mg/kg | | | | |
| | PNEC _{soil} : 45.6 mg/kg | | | | |
| | PNEC _{STP} : 0.14 mg/L | | | | |
| 8.2 | Exposure controls | | | | |
| | Engineering controls | Mandatory general regulations on occupational health. For hazardous constituents, do not allow the environmental and work place concentration limits to exceed values stated above. Ensure that exposed skin is washed and contaminated clothing is disposed of /cleaned if reused. Do not eat, drink or smoke. Avoid skin and eye contact, wash hands and face before and after working with the product. Avoid inhalation of dust and provide adequate local and general ventilation | | | |
| | Personal protection | Observe normal standards for handling chemicals Wash hands before breaks and after work Avoid inhalation of dust if raised Wear personal protective equipment appropriate to the task (see below) | | | |
| | Eye protection | Wear suitable protective glasses/goggles e.g. Polycarbonate (EN 166) | | | |
| | Skin protection | Wear protective chemical resistant gloves (EN 374, PVC, thickness 1.5mm) break through time <480 mins | | | |
| | Respiratory protection | Wear approved dust mask or respirator with filter APF 10/APF 20 | | | |
| | Other protection | Protective overalls. Concentrations of hazardous substances should be monitored in accordance with recognised test methods. Mode, method, type and frequency of testing (measurement of harmful factors) should meet the requirements of local/regional/national laws | | | |
| | Environmental exposure | Do not introduce the product to ground water, sewage, waste water or soil | | | |

| Section 9 | | PHYSICAL AND CHEMICAL PROPERTIES | | | |
|-----------|--|---|--|---|--|
| 9.1 | Basic physical and chemical properties | | | | |
| | Physical form | Solid (mesh: 4-8; 8-14) | Colour | Brown-black | |
| | Odour | Odourless | pH | 7.9 | |
| | Boiling point/range | Not applicable | Melting point/range | >500°C | |
| | Flash point | Not applicable | Bulk density | 700 – 900 kg/m ³ | |
| | Water solubility | 350 µg/L at 20°C | Odour threshold | Not applicable, odourless | |
| | Evaporation rate | Negligible | Flammability | Inflammable | |
| | Explosion limits | Not applicable | Vapour pressure | Not applicable | |
| | Vapour density | Not applicable as product is a solid | Partition coeff. LogPoct/water | Not applicable, raw materials are inorganic substances | |
| | Auto-ignition temperature | >420°C | Viscosity | Not applicable as product is a solid | |
| | Explosive properties | Not applicable | Oxidising properties | According to the UN-Test 0.1 (RL2; 2011) there is no classification requirement | |
| | Decomposition temperature | 704°C | | | |
| 9.2 | Other information | Resistance layer: Not less than 30mm H ₂ O | Mechanical strength: Not less than 73% | Dynamic activity against carbon monoxide: Not less than 50 minutes | |

| Section 10 | | STABILITY AND REACTIVITY |
|------------|----------------------------------|--|
| 10.1 | Reactivity | Stable under normal conditions of handling. Moleculite is hygroscopic |
| 10.2 | Chemical stability | Stable under normal conditions of handling. Moleculite is hygroscopic |
| 10.3 | Hazardous reactions | Hazardous polymerisation will not occur |
| 10.4 | Conditions to avoid | Moisture and very high temperatures. Loses catalytic activity when heated above 200°C |
| 10.5 | Incompatible materials | Risk of explosion in contact with azides, chlorates, oxidising and reducing agents, hydrogen peroxide, flammable substances. Exothermic reactions from aluminium, strong acids and bases and phosphides, hydrogen sulphide, alkali metals and powdered metals. Heating results in oxidation of carbon to carbon dioxide and water and the reduction of copper oxide to metallic copper |
| 10.6 | Hazardous decomposition products | If heated above the decomposition temperature oxides of Manganese and Copper are released |

| Section 11 | | TOXICOLOGICAL INFORMATION |
|------------|----------------------|--|
| 11.1 | | Information on toxicological effects |
| | | LD ₅₀ >2850 mg/kg b.w. (female), the value calculated on the basis of the test material based on the ratio of MnO ₂ and CuO in the reaction mass |
| | Acute toxicity | LD ₅₀ rat (oral) >2000 mg/kg b.w. Data for manganese dioxide/copper oxide reaction mass |
| | | LD ₅₀ rat (oral) >2000 mg/kg Data for manganese dioxide |
| | | LD ₅₀ rat (oral) >2500 mg/kg Data for copper oxide |
| | Dermal compatibility | LD ₅₀ rat (dermal) >2000 mg/kg b.w |
| | Mucous membrane | No data available |
| | Further information | <p>Oral: Based on the lack of effects observed in reliable oral toxicity studies performed for both components and in accordance with the classification criteria set out in Regulation EC No. 1272/2008, the substance does not require classification for acute oral toxicity. However due to the fact that the manganese dioxide is classified for oral toxicity in accordance with the classification criteria set out in Regulation EC No. 1272/2008 section 3.1.3.6.1. the product has been classified for acute oral toxicity.</p> <p>Dermal: Based on the lack of reliable observable effect in oral and cutaneous toxicity tests performed on both components and in accordance with the classification criteria (EC No. 1272/2008), the product does not need to be classified for acute dermal toxicity.</p> <p>Inhalation: According to p 8.5 of Annex VIII to the REACH regulation, acute toxicity data is required for the second route of exposure. Reliable studies are available for two appropriate routes of exposure (oral and cutaneous). It is therefore concluded that an inhalation test is not required. However due to the fact that the manganese dioxide is classified for acute inhalation toxicity according to EC No 1272/2008 section 3.1.3.6.1., the product has been classified for acute inhalation toxicity.</p> <p>Skin corrosion/irritation: Based on available data, the classification criteria are not met.</p> <p>Serious eye damage/irritation: Based on available data, the classification criteria are not met.</p> <p>Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.</p> <p>Germ cell mutagenicity: Based on available data, the classification criteria are not met.</p> <p>Carcinogenicity: Based on available data, the classification criteria are not met.</p> <p>Reproductive toxicity: Based on available data, the classification criteria are not met.</p> <p>STOT-single exposure: Based on available data, the classification criteria are not met.</p> <p>STOT-repeated exposure: Based on the results of epidemiological studies with exposure to manganese dioxide this component is classified for specific target organ toxicity (brain) after repeated inhalation exposure. In accordance with the criteria set out in section 3.9.3 of regulation EC No 1272/2008, the product was classified in terms of specific target organ toxicity (brain) after repeated inhalation exposure STOT RE 2, H373.</p> <p>Aspiration hazard: Based on available data, the classification criteria are not met.</p> |

| Section 12 | | ECOLOGICAL INFORMATION |
|------------|-------------------------------|--|
| 12.1 | Toxicity to aquatic algae | LC ₅₀ (72h; green algae); <i>Desmodesmus subspicatus</i> >143mg/L OECD 201 |
| | Toxicity to bacteria | LC ₅₀ (48h; bacteria) <i>Escherichia. Coli WP uvr A</i> 1250µg OECD TG 471 |
| 12.2 | Persistence and degradability | Hydrolysis According to section 1 of Annex XI REACH regulation, study is not needed as product is an inorganic substance |
| 12.3 | Bio-accumulative potential | No relevant information available |
| 12.4 | Mobility in soil | KP (soil): 2363 L/kg |
| 12.5 | PBT/vPvB assessment | The product does not meet the criteria according to REACH Annex XIII as the product is an inorganic substance |
| 12.6 | Other adverse effects | Hazard assessment for secondary poisoning According to the evaluation of the EU assessment report on copper oxide (directive 98/8/EC concerning the placing of biocidal on the market, copper (II) oxide, 2011, France) bioaccumulation and bio-magnification did not apply for the constituent copper oxide of the submission substance. For the constituent manganese dioxide, the OECD SIDS report on manganese dioxide reported that manganese significantly bio-concentrated in lower organisms but showed small bio-concentration in fish, indicating that manganese has a very low potential to accumulate in the food chain. |

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|--|--|--|---|
| | | | In conclusion, no hazard due to secondary poisoning for the submission substance was anticipated. |
|--|--|--|---|

| Section 13 DISPOSAL CONSIDERATIONS | | |
|------------------------------------|------------------------------------|--|
| 13.1 | Advice on disposal | If possible, recycle to supplier or approved recycling company. If not (e.g. designated as waste), dispose of in accordance with national and local authority regulations, e.g. The Hazardous Waste (England & Wales) Regulations 2008/98/EC |
| | Product and contaminated packaging | Do not introduce into the environment. Collect effluent into containers and send to qualified disposal company in labelled containers. Contaminated packaging must be disposed of as dangerous waste material |

| Section 14 TRANSPORT INFORMATION | | | | | |
|----------------------------------|---|--|------|--|---|
| 14.1 | United Nations number (ADR, IMDG, IATA) | UN 3077 | 14.2 | Proper shipping name (ADR, IMDG, IATA) | Environmentally hazardous substance, solid, n.o.s. (contains copper (II) oxide) |
| 14.3 | Transport class(s) (ADR, IMDG, IATA) | 9 (exempt when <5kg is shipped in packaging ADR 3.4) | 14.4 | Packing group (ADR, IMDG, IATA) | III (exempt when <5kg is shipped in packaging ADR 3.4) |
| 14.5 | Environmental hazards (ADR, IMDG, IATA) | Toxic to the environment in accordance with UN model regulations | 14.6 | Special procedures (ADR, IMDG, IATA) | No special recommendation |
| 14.7 | Transport in bulk | Not applicable | | | |

| Section 15 REGULATORY INFORMATION | | |
|-----------------------------------|--|---|
| 15.1 | Safety, health and environmental regulations | The SDS has been updated in accordance with EC Regulation No 1272/2008 (CLP/GHS/REACH Annex II), Regulation EC 1907/2006, Commission regulation EU No 2015/830, Directive 2008/98/EC and European Parliament and Council Directive 94/62/EC |
| 15.2 | Chemical safety assessment | Has been performed for the mixture |

| Section 16 OTHER INFORMATION | | |
|------------------------------|--|---|
| | Further information | The SDS has been revised in accordance with ECHA dossier for this product and the raw material SDSs |
| | | Complies with COSHH Regulations |
| | Hazard statements referred to in sections 2/3 | |
| | H302 | Harmful if swallowed |
| | H332 | Harmful if inhaled |
| | H373 | May cause damage to organs through prolonged or repeated exposure via inhalation |
| | H400 | Very toxic to aquatic life |
| | H410 | Very toxic to aquatic life with long lasting effects |
| | Prepared by | Dr Patricia Wormald, Molecular Products, PW@molprod.com |
| | Date of Issue | 03 March 2020 |
| | This information is based on our present state of knowledge and is intended to describe our products from the point of view of the safety requirements. It should not be construed as guaranteeing specific problems | |