Safety Data Sheet

Product name:

Moleculite

Safety Data Ref: 6
Initial issue date: 05/06/2013
Revision date: 03/10/2018
Version number: 14

molecular

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 (EC: 910-356-7)
1.12	Relevant use(s)/misuse(s)	As a remover of contaminates 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)
	Emergency contact (other)	China +86 512 8090 3042, China (NRCC): +86 532 8388 9090, Mexico: +52 555 004 8763, Chile: +56 225 829 336, Brazil: +55 11 3197 5891

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	H332	Acute Tox. 4	H302
	STOT RE. .2	H373	Aquatic Chronic 1	H410
	Aquatic Acute 1	H400		
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 our Hi-Cap CO Absorber/Marcisorb unit 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.			

3	COMPOSITION / INFORMATION ON INGREDIENTS				
	Chemical characterisation	Transition metal oxides			
	Chemical name	CAS/REACH No	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)	<35%
	Moleculite	01-2120746889-31-XXXX	910-356-7	Aquatic Acute 1 H400 Aquatic Chronic 1 H410 STOT RE 2 H373	100%

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	
4.3.1		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.

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

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

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 contaminates from breathable gases and as a catalyst

8	EXPOSURE CONTROLS / PERSONAL PROTECTION				
8.1	Workplace Exposure Limits (WELs) have been assigned by the HSE (EH40/2005)				
	LTEL (8 hour TWA)	ppm	0.2	mg/m³	Data for manganese and its inorganic compounds (EH40/2005), third edition, published 2018.
	LTEL (8 hour TWA)	ppm	1.0	mg/m³	Data for copper and its inorganic compounds (EH40/2005), third edition, published 2018.
	LTEL (8 hour TWA)	ppm	0.2	mg/m³	Data for copper fume (as Cu) (EH40/2005), third edition, published 2018.
	LTEL (8 hour TWA)	ppm	10	mg/m³ (inhalable)	Dust (information from ECHA dossier)
	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.				
8.1.1	Monitoring procedures				
	Use methods described un the European standards				
	Systemic effects, inhalation exposure for employees DNEL $_{\text{long term}}$: 160µg/m³				
	Systemic effects, skin exposure for employees DNEL $_{\text{long term}}$: 4.5mg/kg b.w./day				
	Systemic effects, inhalation exposure for general public DNEL $_{\text{long term}}$: 20µm/m³				
	Systemic effects, skin exposure for general public DNEL $_{\text{long term}}$: 2.25 mg/kg b.w./day				
	Systemic effects, oral exposure for general public DNEL $_{\text{long term}}$: 0.23mg/kg b.w./day				
	PNEC $_{\text{fresh water}}$: 7.8 µg/L				
	PNEC $_{\text{marine water}}$: 0.78 µg/L				
	PNEC $_{\text{sediment (fresh water)}}$: 87 mg/kg				
	PNEC $_{\text{sediment (marine water)}}$: 8.7 mg/kg				
	PNEC $_{\text{soil}}$: 45.6 mg/kg				
	PNEC $_{\text{STP}}$: 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.			
8.2	Environmental exposure	Do not introduce the product to ground water, sewage, waste water or soil.			

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	Relative density	4.18 at 20°C
	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	Manganese dioxide 1026°C Copper oxide 535°C		

9.2	Other information	Resistance layer: Not less than 30mm H_2O	Mechanical strength: Not less than 73%	Dynamic activity against carbon monoxide: Not less than 50 minutes

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	Manganese dioxide [EC: 215-202-6] Risk of explosion in contact with azides, chlorates, oxidising agents, hydrogen peroxide, flammable substances. Exothermic reactions from aluminium, oxidising agents, reducing agents, strong acids and phosphides. Copper oxide [EC: 215-269-1] Strong bases, strong oxidising agents, reducing agents, hydrogen sulphide, aluminium, alkali metals and powdered metals. Heating a mixture of copper oxide with organic substances results in oxidation of carbon to carbon dioxide and water and the reduction of copper oxide to metallic copper.
10.6	Hazardous decomposition products	Manganese Dioxide [EC: 215-202-6] If heated above the decomposition temperature oxides of Manganese are released. Copper oxide [EC: 215-269-1] If heated above the decomposition temperature oxides of Copper are released.

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	**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. **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. **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. **Skin corrosion/irritation:** Based on available data, the classification criteria are not met. **Serious eye damage/irritation:** Based on available data, the classification criteria are not met. **Respiratory or skin sensitisation:** Based on available data, the classification criteria are not met. **Germ cell mutagenicity:** Based on available data, the classification criteria are not met. **Carcinogenicity:** Based on available data, the classification criteria are not met. **Reproductive toxicity:** Based on available data, the classification criteria are not met. **STOT-single exposure:** Based on available data, the classification criteria are not met. **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. **Aspiration hazard:** Based on available data, the classification criteria are not met.		

12	ECOLOGICAL INFORMATION				
12.1	Toxicity to fish	LC_{50}	(96h; Rainbow trout; *Oncorhynchus mykiss)*	>143mg/L	OECD 203
		NOEC	(60 days; Brown trout, *Salmo trutta*)	0.21 mg/L	OECD 29
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. In conclusion, no hazard due to secondary poisoning for the submission substance was anticipated.		

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.

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		Special procedures (ADR, IMDG, IATA)	No special recommendation
14.7	Transport in bulk	Not applicable			

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.

16	OTHER INFORMATION	
	Further information	The SDS has been revised in accordance with ECHA dossier for this product and the raw material SDS's.
		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	3rd October 2018
	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.	