



SAFETY DATA SHEET

SPECIALTY ELECTRONIC MATERIALS UK LIMITED

Safety Data Sheet according to Regulation (EC) No 1907/2006 - Annex II

Product name: MOLYKOTE® D-321 R Anti-Friction Coating
Spray

Revision Date: 13.09.2023
Version: 8.0
Date of last issue: 09.01.2023
Print Date: 14.09.2023

SPECIALTY ELECTRONIC MATERIALS UK LIMITED encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name: MOLYKOTE® D-321 R Anti-Friction Coating Spray

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

Identified uses: Lubricants and lubricant additives

1.3 Details of the supplier of the safety data sheet

COMPANY IDENTIFICATION

SPECIALTY ELECTRONIC MATERIALS UK
LIMITED
KINGS COURT, LONDON ROAD
STEVENAGE
England
SG1 2NG
UNITED KINGDOM

Manufacturer DuPont Specialty Products GmbH & Co. KG

Customer Information Number: 00800-3876-6838
SDSQuestion-EU@dupont.com

1.4 EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: +(44)-870-8200418

Local Emergency Contact: +(44)-870-8200418

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008:

Aerosols - Category 1 - H222, H229

Specific target organ toxicity - repeated exposure - Category 2 - H373
Long-term (chronic) aquatic hazard - Category 3 - H412
For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008:

Hazard pictograms



Signal word: **DANGER**

Hazard statements

H222 Extremely flammable aerosol.
H229 Pressurised container: May burst if heated.
H373 May cause damage to organs (Central nervous system) through prolonged or repeated exposure.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211 Do not spray on an open flame or other ignition source.
P251 Do not pierce or burn, even after use.
P260 Do not breathe dust or mist.
P260 Do not breathe spray.
P271 Use only outdoors or in a well-ventilated area.
P410 + P412 Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.

Supplemental information

EUH066 Repeated exposure may cause skin dryness or cracking.
The following percentage of the mixture consists of ingredient(s) with unknown acute dermal toxicity:
1.6 %

Contains naphtha (petroleum), hydrodesulphurized heavy

2.3 Other hazards

Endocrine disrupting properties (human health):

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Endocrine disrupting properties (environment):

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

PBT and vPvB assessment:

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature: Molybdenum disulfide, aerosol

3.2 Mixtures

This product is a mixture.

Identification number	Component	Classification according to Regulation (EU) 1272/2008 (CLP)	specific concentration limit/ M-Factors/ Acute toxicity estimate	%
CASRN 74-98-6 EC-No. 200-827-9 Index-No. 601-003-00-5 REACH No -	propane	Flam. Gas 1 - H220 Press. Gas Compr. Gas - H280	Inhalation ATE: > 425000 ppm (vapour)	>= 10.0 - < 20.0 %
CASRN 123-86-4 EC-No. 204-658-1 Index-No. 607-025-00-1 REACH No -	n-butyl acetate	Flam. Liq. 3 - H226 STOT SE 3 - H336 EUH066	Oral ATE: 12,789 mg/kg Dermal ATE: > 14,112 mg/kg	>= 10.0 - < 20.0 %
CASRN 64742-82-1 EC-No. 265-185-4 Index-No. 649-330-00-2 REACH No -	naphtha (petroleum), hydrodesulphurized heavy	Flam. Liq. 3 - H226 STOT SE 3 - H336 STOT RE 1 - H372 Asp. Tox. 1 - H304 Aquatic Chronic 2 - H411	Oral ATE: > 5,000 mg/kg Inhalation ATE: > 13.1 mg/l (vapour) Dermal ATE: > 4,000 mg/kg	>= 2.5 - < 10.0 %
CASRN 9022-96-2 EC-No. Polymer Index-No. - REACH No -	Polybutyl titanate	Flam. Liq. 3 - H226 Eye Irrit. 2 - H319	Oral ATE: > 2,000 mg/kg Dermal ATE: > 5,000 mg/kg	>= 1.0 - < 10.0 %
CASRN 1314-13-2 EC-No. 215-222-5 Index-No.	zinc oxide	Aquatic Acute 1 - H400 Aquatic Chronic 1 - H410	M-Factor: 1 [Acute] 1 [Chronic] Oral ATE: > 5,000 mg/kg	>= 0.1 - < 0.25 %

030-013-00-7 REACH No 01-2119463881-32			Inhalation ATE: > 5 mg/l (dust/mist)	
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Substances with a workplace exposure limit

Identification number	Component	Classification according to Regulation (EU) 1272/2008 (CLP)	specific concentration limit/ M-Factors/ Acute toxicity estimate	%
CASRN 106-97-8 EC-No. 203-448-7 Index-No. 601-004-00-0 REACH No -	butane	Flam. Gas 1 - H220 Press. Gas Compr. Gas - H280	Inhalation ATE: 658 mg/l (vapour)	>= 50.0 - < 60.0 %

CASRN 1317-33-5 EC-No. 215-263-9 Index-No. - REACH No -	Molybdenum disulfide	Not classified	Oral ATE: > 2,000 mg/kg Dermal ATE: > 2,000 mg/kg	>= 1.0 - < 10.0 %
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CASRN 7782-42-5 EC-No. 231-955-3 Index-No. - REACH No 01-2119486977-12	Graphite	Not classified	Oral ATE: > 2,000 mg/kg Inhalation ATE: > 2 mg/l (dust/mist)	>= 1.0 - < 10.0 %
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For the full text of the H-Statements mentioned in this Section, see Section 16.

Note

naphtha (petroleum), hydrodesulphurized heavy:

The classification as a carcinogen or mutagen need not to apply because the substance contains less than 0.1% w/w benzene (EINECS No 200-753-7). Note P of Annex VI to Regulation (EC) 1272/2008.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General advice:

First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Skin contact: Wash off with plenty of water.

Eye contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Ingestion: No emergency medical treatment necessary.

4.2 Most important symptoms and effects, both acute and delayed:

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician: Maintain adequate ventilation and oxygenation of the patient. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. Exposure may increase "myocardial irritability". Do not administer sympathomimetic drugs such as epinephrine unless absolutely necessary. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Repeated excessive exposure may aggravate preexisting lung disease.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Water spray Alcohol-resistant foam Carbon dioxide (CO₂) Dry chemical

Unsuitable extinguishing media: Do not use direct water stream.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products: Carbon oxides Sulphur oxides

Unusual Fire and Explosion Hazards: Flash back possible over considerable distance. May form explosive mixtures in air. Exposure to combustion products may be a hazard to health. If the temperature rises there is danger of the vessels bursting due to the high vapor pressure. Vapours may form explosive mixtures with air.

5.3 Advice for firefighters

Fire Fighting Procedures: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. EXPLOSION HAZARD. Fight

advanced fires from a protected location. Do not use a solid water stream as it may scatter and spread fire.

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Fight fire remotely due to the risk of explosion. Use water spray to cool unopened containers. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures: Remove all sources of ignition. Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.

6.2 Environmental precautions: Do not release the product to the aquatic environment above defined regulatory levels. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and materials for containment and cleaning up: Non-sparking tools should be used. Soak up with inert absorbent material. Suppress (knock down) gases/vapours/mists with a water spray jet. Clean up remaining materials from spill with suitable absorbant. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

6.4 Reference to other sections:

See sections: 7, 8, 11, 12 and 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling: Avoid inhalation of vapour or mist. Do not swallow. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Take care to prevent spills, waste and minimize release to the environment. Close valve after each use and when empty. Do NOT change or force fit connections. Open the valves slowly to prevent pressure surges. Handle in accordance with good industrial hygiene and safety practice. Do not spray on an open flame or other ignition source.

Use with local exhaust ventilation. Use only in an area equipped with explosion proof exhaust ventilation. See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

7.2 Conditions for safe storage, including any incompatibilities: Keep in a cool, well-ventilated place. Keep away from direct sunlight. Store in accordance with the particular national regulations. Do not pierce or burn, even after use. Keep cool. Protect from sunlight.

Do not store with the following product types: Oxidizing agents. Self-reactive substances and mixtures. Organic peroxides. Flammable solids. Pyrophoric liquids. Pyrophoric solids. Self-heating substances and mixtures. Substances and mixtures, which in contact with water, emit flammable gases. Explosives.

Unsuitable materials for containers: None known.

7.3 Specific end use(s): Information on specific end use(s) of this product may be provided in a technical data sheet/annex to the SDS (if available).

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Component	Regulation	Type of listing	Value
propane	ACGIH		See Further information
	Further information: See Appendix F: Minimal Oxygen Content; EX: Explosion hazard: the substance is a flammable asphyxiant or excursions above the TLV® could approach 10% of the lower explosive limit.; asphyxia: Asphyxia; D: Simple asphyxiant; see discussion covering Minimal Oxygen Content found in the 'Definitions and Notations' section following the NIC tables		
n-butyl acetate	ACGIH	TWA	50 ppm
	Further information: URT irr: Upper Respiratory Tract irritation; eye irr: Eye irritation		
	ACGIH	STEL	150 ppm
	Further information: URT irr: Upper Respiratory Tract irritation; eye irr: Eye irritation		
	GB EH40	TWA	724 mg/m3 150 ppm
	GB EH40	STEL	966 mg/m3 200 ppm
	2019/1831/EU	STEL	723 mg/m3 150 ppm
	Further information: Indicative		
	2019/1831/EU	TWA	241 mg/m3 50 ppm
	Further information: Indicative		
zinc oxide	ACGIH	TWA Respirable particulate matter	2 mg/m3
	ACGIH	STEL Respirable particulate matter	10 mg/m3
butane	ACGIH	STEL	1,000 ppm
	Further information: EX: Explosion hazard: the substance is a flammable asphyxiant or excursions above the TLV® could approach 10% of the lower explosive limit.; CNS impair: Central Nervous System impairment		
	GB EH40	STEL	1,810 mg/m3 750 ppm
	Further information: Carc: Capable of causing cancer and/or heritable genetic damage.; Carcinogenic only applies if butane contains more than 0.1% of buta-1,3-diene		
	GB EH40	TWA	1,450 mg/m3 600 ppm
	Further information: Carc: Capable of causing cancer and/or heritable genetic damage.; Carcinogenic only applies if butane contains more than 0.1% of buta-1,3-diene		
Molybdenum disulfide	ACGIH	TWA Inhalable particulate matter	10 mg/m3 , Molybdenum
	ACGIH	TWA Respirable particulate matter	3 mg/m3 , Molybdenum

	GB EH40	TWA	10 mg/m3 , Molybdenum
	GB EH40	STEL	20 mg/m3 , Molybdenum
Graphite	ACGIH	TWA Respirable particulate matter	2 mg/m3
Further information: pneumoconiosis: Pneumoconiosis			
	GB EH40	TWA inhalable dust	10 mg/m3
	GB EH40	TWA Respirable dust	4 mg/m3

This material contains a simple asphyxiant which may displace oxygen. Insure adequate ventilation to prevent an oxygen deficient atmosphere.

The following substance(s), which have Occupational Exposure Limit(s) (OEL), may be formed during handling or processing:

butanol

Derived No Effect Level

n-butyl acetate

Workers

<i>Acute systemic effects</i>		<i>Acute local effects</i>		<i>Long-term systemic effects</i>		<i>Long-term local effects</i>	
Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
n.a.	600 mg/m3	11 mg/kg bw/day	600 mg/m3	11 mg/kg bw/day	300 mg/m3	n.a.	300 mg/m3

Consumers

<i>Acute systemic effects</i>			<i>Acute local effects</i>		<i>Long-term systemic effects</i>			<i>Long-term local effects</i>	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
6 mg/kg bw/day	300 mg/m3	2 mg/kg bw/day	n.a.	300 mg/m3	6 mg/kg bw/day	35.7 mg/m3	2 mg/kg bw/day	n.a.	35.7 mg/m3

naphtha (petroleum), hydrodesulphurized heavy

Workers

<i>Acute systemic effects</i>		<i>Acute local effects</i>		<i>Long-term systemic effects</i>		<i>Long-term local effects</i>	
Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
n.a.	570 mg/m3	n.a.	330 mg/m3	44 mg/kg bw/day	330 mg/m3	n.a.	n.a.

Consumers

<i>Acute systemic effects</i>			<i>Acute local effects</i>		<i>Long-term systemic effects</i>			<i>Long-term local effects</i>	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
n.a.	570 mg/m3	n.a.	n.a.	n.a.	26 mg/kg bw/day	71 mg/m3	26 mg/kg bw/day	n.a.	n.a.

zinc oxide

Workers

<i>Acute systemic effects</i>		<i>Acute local effects</i>		<i>Long-term systemic effects</i>		<i>Long-term local effects</i>	
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Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
n.a.	n.a.	n.a.	n.a.	83 mg/kg bw/day	5 mg/m3	n.a.	n.a.

Consumers

Acute systemic effects			Acute local effects		Long-term systemic effects			Long-term local effects	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
n.a.	n.a.	n.a.	n.a.	n.a.	83 mg/kg bw/day	2.5 mg/m3	0.83 mg/kg bw/day	n.a.	n.a.

Graphite

Workers

Acute systemic effects			Acute local effects		Long-term systemic effects		Long-term local effects	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.2 mg/m3

Consumers

Acute systemic effects			Acute local effects		Long-term systemic effects			Long-term local effects	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	813 mg/kg bw/day	n.a.	0.3 mg/m3

Predicted No Effect Concentration

n-butyl acetate

Compartment	PNEC
Fresh water	0.18 mg/l
Marine water	0.018 mg/l
Intermittent use/release	0.36 mg/l
Fresh water sediment	0.981 mg/kg dry weight (d.w.)
Marine sediment	0.0981 mg/kg dry weight (d.w.)
Soil	0.09 mg/kg dry weight (d.w.)
Sewage treatment plant	35.6 mg/l

zinc oxide

Compartment	PNEC
Fresh water	20.6 µg/l
Marine water	6.1 µg/l
Sewage treatment plant	52 µg/l
Fresh water sediment	117.8 mg/kg
Marine sediment	56.5 mg/kg
Soil	35.6 mg/kg

8.2 Exposure controls

Engineering measures: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only in enclosed systems or with local exhaust ventilation. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and people working at this point. Lethal concentrations may exist in areas with poor ventilation.

Individual protection measures

Eye/face protection: Use safety glasses (with side shields). Safety glasses (with side shields) should be consistent with EN 166 or equivalent. If exposure causes eye discomfort, use a full-face respirator (meeting standard EN 136) with organic vapor cartridge (meeting standard EN 14387).

Skin protection

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Use chemical resistant gloves classified under Standard EN374: Protective gloves against chemicals and micro-organisms. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Viton. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Polyvinyl chloride ("PVC" or "vinyl"). When prolonged or frequently repeated contact may occur, a glove with a protection class of 4 or higher (breakthrough time greater than 120 minutes according to EN 374) is recommended. When only brief contact is expected, a glove with a protection class of 1 or higher (breakthrough time greater than 10 minutes according to EN 374) is recommended. Glove thickness alone is not a good indicator of the level of protection a glove provides against a chemical substance as this level of protection is also highly dependent on the specific composition of the material that the glove is fabricated from. The thickness of the glove must, depending on model and type of material, generally be more than 0.35 mm to offer sufficient protection for prolonged and frequent contact with the substance. As an exception to this general rule it is known that multilayer laminate gloves may offer prolonged protection at thicknesses less than 0.35 mm. Other glove materials with a thickness of less than 0.35 mm may offer sufficient protection when only brief contact is expected. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other protection: Wear clean, body-covering clothing.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. When respiratory protection is required, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply.

Environmental exposure controls

See SECTION 7: Handling and storage and SECTION 13: Disposal considerations for measures to prevent excessive environmental exposure during use and waste disposal.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	aerosol (20 °C,) Form Aerosol containing a dissolved gas
Colour	black
Odour	solvent-like Odour Threshold No data available
Melting point/freezing point	Melting point/range: No data available
Boiling point or initial boiling point and boiling range	Boiling point/boiling range: Not applicable
Flammability	Gases/Solids Extremely flammable aerosol. Liquids No data available
Lower explosion limit and upper explosion limit / flammability limit	Lower explosion limit / Lower flammability limit No data available Upper explosion limit / Upper flammability limit No data available
Flash point	Not applicable
Auto-ignition temperature	No data available
Decomposition temperature	Thermal decomposition No data available
pH	Not applicable
Viscosity	Viscosity, kinematic Not applicable Viscosity, dynamic Not applicable
Solubility(ies)	Water solubility No data available
Partition coefficient: n-	No data available

octanol/water

Vapour pressure	No data available
Density and / or relative density	Relative density 1.05
Relative vapour density	No data available
Particle characteristics	Particle size Not applicable

9.2 Other information

Oxidizing properties	The substance or mixture is not classified as oxidizing.
Aerosols	Extremely flammable aerosol.
Evaporation rate	Not applicable
Molecular weight	No data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity: Not classified as a reactivity hazard.

10.2 Chemical stability: Stable under normal conditions.

10.3 Possibility of hazardous reactions: Can react with strong oxidizing agents. If the temperature rises there is danger of the vessels bursting due to the high vapor pressure. Vapours may form explosive mixture with air. Extremely flammable aerosol.

10.4 Conditions to avoid: Heat, flames and sparks.

10.5 Incompatible materials: Oxidizing agents

10.6 Hazardous decomposition products: Butanol.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity

Acute toxicity (Acute oral toxicity)

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Acute toxicity (Acute dermal toxicity)

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Acute toxicity (Acute inhalation toxicity)

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Skin corrosion/irritation

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Repeated exposure may cause skin dryness or cracking.

Serious eye damage/eye irritation

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Respiratory or skin sensitisation

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Germ cell mutagenicity

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Carcinogenicity

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Reproductive toxicity

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Toxicity to reproduction assessment :

Product test data not available. Refer to component data.

Assessment Teratogenicity:

Product test data not available. Refer to component data.

STOT - single exposure

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

STOT - repeated exposure

Specific target organ toxicity - repeated exposure, Category 2

H373: May cause damage to organs through prolonged or repeated exposure.

Classification procedure: Calculation method

Product test data not available. Refer to component data.

Aspiration Hazard

Not classified

Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

COMPONENTS INFLUENCING TOXICOLOGY:

propane

Acute toxicity (Acute oral toxicity)

Single dose oral LD50 has not been determined.

Acute toxicity (Acute dermal toxicity)

The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)

LC50, Rat, male and female, 4 Hour, vapour, > 425000 ppm

Skin corrosion/irritation

No hazard from gas.

Liquid may cause frostbite upon skin contact.
Effects may be delayed.

Serious eye damage/eye irritation

Essentially nonirritating to eyes.
Liquid may cause frostbite.

Respiratory or skin sensitisation

For skin sensitization:
No relevant data found.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity

In vitro genetic toxicity studies were negative.

Carcinogenicity

No relevant data found.

Reproductive toxicity

Toxicity to reproduction assessment :
In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

Assessment Teratogenicity:

Screening studies suggest that this material does not affect fetal development.

STOT - single exposure

Available data are inadequate to determine single exposure specific target organ toxicity.

STOT - repeated exposure

Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Aspiration Hazard

Based on physical properties, not likely to be an aspiration hazard.

n-butyl acetate

Acute toxicity (Acute oral toxicity)

LD50, Rat, male, 12,789 mg/kg

LD50 Oral, Rat, female, 10,760 mg/kg

Acute toxicity (Acute dermal toxicity)

LD50, Rabbit, male and female, > 14,112 mg/kg

Acute toxicity (Acute inhalation toxicity)

The LC50 has not been determined.

Skin corrosion/irritation

Brief contact is essentially nonirritating to skin.
Prolonged contact may cause severe skin irritation with local redness and discomfort.

May cause drying and flaking of the skin.

Serious eye damage/eye irritation

May cause moderate eye irritation.

Corneal injury is unlikely.

Vapor may cause eye irritation experienced as mild discomfort and redness.

Respiratory or skin sensitisation

Did not cause allergic skin reactions when tested in guinea pigs.

Did not cause allergic skin reactions when tested in humans.

For respiratory sensitization:

No relevant data found.

Germ cell mutagenicity

In vitro genetic toxicity studies were negative.

Carcinogenicity

No relevant data found.

Reproductive toxicity

Toxicity to reproduction assessment :

In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. In animal studies, did not interfere with fertility. No toxicity to reproduction

Assessment Teratogenicity:

Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

STOT - single exposure

May cause drowsiness or dizziness.

Route of Exposure: Inhalation

Target Organs: Nervous system

STOT - repeated exposure

Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Aspiration Hazard

Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

naphtha (petroleum), hydrodesulphurized heavy**Acute toxicity (Acute oral toxicity)**

Based on data from similar materials LD50, Rat, male and female, > 5,000 mg/kg

Acute toxicity (Acute dermal toxicity)

Based on data from similar materials LD50, Rat, male and female, > 4,000 mg/kg No deaths occurred at this concentration.

Acute toxicity (Acute inhalation toxicity)

Based on data from similar materials LC50, Rat, 4 Hour, vapour, > 13.1 mg/l

Skin corrosion/irritation

Brief contact may cause slight skin irritation with local redness.
Prolonged or repeated skin contact can cause the following:
May cause drying and flaking of the skin.

Serious eye damage/eye irritation

May cause slight temporary eye irritation.
Corneal injury is unlikely.

Respiratory or skin sensitisation

For skin sensitization:
For similar material(s):
Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity

For similar material(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Carcinogenicity

No relevant data found.

Reproductive toxicity

Toxicity to reproduction assessment :
For similar material(s): In animal studies, did not interfere with fertility.

Assessment Teratogenicity:

For similar material(s): Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

STOT - single exposure

May cause drowsiness or dizziness.

STOT - repeated exposure

For similar material(s):
In humans, effects have been reported on the following organs:
Central nervous system.

Aspiration Hazard

May be fatal if swallowed and enters airways.

Polybutyl titanate**Acute toxicity (Acute oral toxicity)**

LD50, Rat, > 2,000 mg/kg

Acute toxicity (Acute dermal toxicity)

LD50, Rat, > 5,000 mg/kg

Acute toxicity (Acute inhalation toxicity)

The LC50 has not been determined.

Skin corrosion/irritation

Essentially nonirritating to skin.

Serious eye damage/eye irritation

May cause severe eye irritation.

Respiratory or skin sensitisation

For skin sensitization:

No relevant data found.

For respiratory sensitization:

No relevant data found.

Germ cell mutagenicity

No relevant data found.

Carcinogenicity

No relevant data found.

Reproductive toxicity

Toxicity to reproduction assessment :

No relevant data found.

Assessment Teratogenicity:

No relevant data found.

STOT - single exposure

Evaluation of available data suggests that this material is not an STOT-SE toxicant.

STOT - repeated exposure

No relevant data found.

Aspiration Hazard

Based on physical properties, not likely to be an aspiration hazard.

zinc oxide

Acute toxicity (Acute oral toxicity)

LD50, Rat, > 5,000 mg/kg

Acute toxicity (Acute dermal toxicity)

The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)

LC50, Rat, 4 Hour, dust/mist, > 5 mg/l No deaths occurred at this concentration.

Skin corrosion/irritation

Prolonged contact is essentially nonirritating to skin.

Serious eye damage/eye irritation

May cause slight temporary eye irritation.

Corneal injury is unlikely.

Respiratory or skin sensitisation

For skin sensitization:
No relevant data found.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity

In vitro genetic toxicity studies were negative in some cases and positive in other cases.

Carcinogenicity

Available data are inadequate to evaluate carcinogenicity.

Reproductive toxicity

Toxicity to reproduction assessment :
In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

Assessment Teratogenicity:
No relevant data found.

STOT - single exposure

Available data are inadequate to determine single exposure specific target organ toxicity.

Aspiration Hazard

Based on physical properties, not likely to be an aspiration hazard.

butane

Acute toxicity (Acute oral toxicity)

Single dose oral LD50 has not been determined.

Acute toxicity (Acute dermal toxicity)

The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)

LC50, Rat, 4 Hour, vapour, 658 mg/l

Skin corrosion/irritation

No hazard from gas.

Serious eye damage/eye irritation

No hazard from gas.

Respiratory or skin sensitisation

For skin sensitization:
No relevant data found.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Carcinogenicity

No relevant data found.

Reproductive toxicity

Toxicity to reproduction assessment :

No relevant data found.

Assessment Teratogenicity:

No relevant data found.

STOT - single exposure

Evaluation of available data suggests that this material is not an STOT-SE toxicant.

STOT - repeated exposure

Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Aspiration Hazard

Based on physical properties, not likely to be an aspiration hazard.

Molybdenum disulfide

Acute toxicity (Acute oral toxicity)

LD50, Rat, > 2,000 mg/kg No deaths occurred at this concentration.

Acute toxicity (Acute dermal toxicity)

LD50, Rat, male and female, > 2,000 mg/kg No deaths occurred at this concentration.

Skin corrosion/irritation

Brief contact is essentially nonirritating to skin.

Prolonged contact may cause slight skin irritation with local redness.

Serious eye damage/eye irritation

May cause slight temporary eye irritation.

Corneal injury is unlikely.

Respiratory or skin sensitisation

For skin sensitization:

Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:

No relevant data found.

Germ cell mutagenicity

For similar material(s): In vitro genetic toxicity studies were negative.

Carcinogenicity

No relevant data found.

Reproductive toxicity

Toxicity to reproduction assessment :

No relevant data found.

Assessment Teratogenicity:

No relevant data found.

STOT - single exposure

Evaluation of available data suggests that this material is not an STOT-SE toxicant.

STOT - repeated exposure

No relevant data found.

Aspiration Hazard

Based on physical properties, not likely to be an aspiration hazard.

Graphite

Acute toxicity (Acute oral toxicity)

LD50, Rat, > 2,000 mg/kg OECD Test Guideline 423

Acute toxicity (Acute dermal toxicity)

The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)

An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration. LC50, Rat, 4 Hour, dust/mist, > 2 mg/l OECD Test Guideline 403

Skin corrosion/irritation

Brief contact is essentially nonirritating to skin.

Serious eye damage/eye irritation

May cause slight temporary eye irritation.

Respiratory or skin sensitisation

Did not demonstrate the potential for contact allergy in mice.

Germ cell mutagenicity

In vitro genetic toxicity studies were negative.

Reproductive toxicity

Toxicity to reproduction assessment :

In animal studies, did not interfere with reproduction.

Assessment Teratogenicity:

Did not cause birth defects or any other fetal effects in laboratory animals.

STOT - single exposure

The substance or mixture is not classified as specific target organ toxicant, single exposure.

STOT - repeated exposure

Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Aspiration Hazard

No aspiration toxicity classification

11.2. Information on other hazards

Endocrine disrupting properties

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Further information

No data available

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

12.1 Toxicity

propane

Acute toxicity to fish

Material is not classified as dangerous to aquatic organisms.

n-butyl acetate

Acute toxicity to fish

Material is harmful to aquatic organisms (LC50/EC50/IC50 between 10 and 100 mg/L in the most sensitive species).

LC50, Pimephales promelas (fathead minnow), flow-through test, 96 Hour, 18 mg/l

Acute toxicity to aquatic invertebrates

LC50, Daphnia magna (Water flea), 48 Hour, 44 mg/l

Acute toxicity to algae/aquatic plants

ErC50, Desmodesmus subspicatus (green algae), 72 Hour, Growth rate inhibition, 648 mg/l

Toxicity to bacteria

EC50, Bacteria, 16 Hour, > 1,000 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), 21 d, 23 mg/l

naphtha (petroleum), hydrodesulphurized heavy

Acute toxicity to fish

Material is toxic to aquatic organisms (LC50/EC50/IC50 between 1 and 10 mg/L in the most sensitive species).

Based on data from similar materials

LL50, Oncorhynchus mykiss (rainbow trout), 96 Hour, 10 - 30 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates

Based on data from similar materials

EL50, Daphnia magna (Water flea), 48 Hour, 10 - 22 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants

Based on data from similar materials

EL50, Pseudokirchneriella subcapitata (green algae), 72 Hour, 4.6 - 10 mg/l, OECD Test Guideline 201

Based on data from similar materials

NOELR, Pseudokirchneriella subcapitata (green algae), 72 Hour, 0.22 mg/l, OECD Test Guideline 201

Chronic toxicity to aquatic invertebrates

Based on data from similar materials

NOELR, Daphnia magna (Water flea), 21 d, 0.097 mg/l

Polybutyl titanate**Acute toxicity to fish**

Not expected to be acutely toxic to aquatic organisms.

zinc oxide**Acute toxicity to fish**

Material is very toxic to aquatic organisms (LC50/EC50/IC50 below 1 mg/L in the most sensitive species).

LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 Hour, 0.14 - 1.1 mg/l

LC50, Danio rerio (zebra fish), 96 Hour, 1 - 10 mg/l

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), 48 Hour, 1 - 10 mg/l

Acute toxicity to algae/aquatic plants

IC50, Selenastrum capricornutum (green algae), 72 Hour, Growth rate, 0.136 mg/l

Toxicity to bacteria

Based on data from similar materials

EC50, 3 Hour, 5.2 mg/l, OECD Test Guideline 209

Chronic toxicity to fish

NOEC, Danio rerio (zebra fish), 32 d, mortality, \geq 0.540 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), 21 d, number of offspring, 0.04 mg/l

butane**Acute toxicity to fish**

Material is toxic to aquatic organisms (LC50/EC50/IC50 between 1 and 10 mg/L in the most sensitive species).

Molybdenum disulfide**Acute toxicity to fish**

Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).

For similar material(s):

LC50, Fish, 96 Hour, $>$ 100 mg/l

Acute toxicity to aquatic invertebrates

Based on data from similar materials
EC50, Daphnia magna (Water flea), 48 Hour, > 100 mg/l

Acute toxicity to algae/aquatic plants

Based on data from similar materials
ErC50, algae, 72 Hour, Growth rate, > 100 mg/l

Toxicity to bacteria

EC50, 30 Hour, Respiration rates., > 100 mg/l

Chronic toxicity to fish

Based on data from similar materials
NOEC, Fish, 34 d, > 10 mg/l

Chronic toxicity to aquatic invertebrates

Based on data from similar materials
NOEC, Daphnia magna, 21 d, > 10 mg/l

Graphite**Acute toxicity to fish**

No toxicity at the limit of solubility
LC50, Danio rerio (zebra fish), 96 Hour, > 100 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates

No toxicity at the limit of solubility
EC50, Daphnia magna (Water flea), 48 Hour, > 100 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants

EC50, Raphidocelis subcapitata (freshwater green alga), 72 Hour, > 100 mg/l, OECD Test Guideline 201
NOEC, Raphidocelis subcapitata (freshwater green alga), 72 Hour, >= 100 mg/l, OECD Test Guideline 201

Toxicity to bacteria

EC50, 3 Hour, > 1,012.5 mg/l, OECD Test Guideline 209

12.2 Persistence and degradability**propane**

Biodegradability: No relevant data found.

n-butyl acetate

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Pass

Biodegradation: 83 %

Exposure time: 28 d

Method: OECD Test Guideline 301D or Equivalent

naphtha (petroleum), hydrodesulphurized heavy

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

Based on data from similar materials 10-day Window: Pass

Biodegradation: 74.7 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Polybutyl titanate

Biodegradability: Biodegradability is not applicable to inorganic substances.

zinc oxide

Biodegradability: Biodegradability is not applicable to inorganic substances.

butane

Biodegradability: Material is expected to be readily biodegradable.

Molybdenum disulfide

Biodegradability: Biodegradability is not applicable to inorganic substances.

Graphite

Biodegradability: Not applicable

12.3 Bioaccumulative potential

propane

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): 2.36 Measured

n-butyl acetate

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): Pow: 3.2 at 25 °C Measured

Bioconcentration factor (BCF): 15 Fish Estimated.

naphtha (petroleum), hydrodesulphurized heavy

Bioaccumulation: Based on data from similar materials

Partition coefficient: n-octanol/water(log Pow): > 4

Polybutyl titanate

Bioaccumulation: No relevant data found.

zinc oxide

Bioaccumulation: Partitioning from water to n-octanol is not applicable.

Bioconcentration factor (BCF): 177 Fish

butane

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): 2.89 Measured

Molybdenum disulfide

Bioaccumulation: Partitioning from water to n-octanol is not applicable.

Graphite

Bioaccumulation: Not applicable Not applicable

12.4 Mobility in soil

propane

Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient (Koc): 24 - 460 Estimated.

n-butyl acetate

Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient (Koc): 19 - 70 Estimated.

naphtha (petroleum), hydrodesulphurized heavy

No relevant data found.

Polybutyl titanate

No relevant data found.

zinc oxide

No relevant data found.

butane

Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient (Koc): 44 - 900 Estimated.

Molybdenum disulfide

No relevant data found.

Graphite

No relevant data found.

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

propane

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

n-butyl acetate

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

naphtha (petroleum), hydrodesulphurized heavy

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Polybutyl titanate

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

zinc oxide

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

butane

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Molybdenum disulfide

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Graphite

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

12.6 Endocrine disrupting properties

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects**propane**

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

n-butyl acetate

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

naphtha (petroleum), hydrodesulphurized heavy

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Polybutyl titanate

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

zinc oxide

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

butane

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Molybdenum disulfide

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Graphite

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Do not dump into any sewers, on the ground, or into any body of water. This product, when being disposed of in its unused and uncontaminated state should be treated as a hazardous waste according to EC Directive 2008/98/EC. Any disposal practices must be in compliance with all national and provincial laws and any municipal or local by-laws governing hazardous waste. For used, contaminated and residual materials additional evaluations may be required.

The definitive assignment of this material to the appropriate EWC group and thus its proper EWC code will depend on the use that is made of this material. Contact the authorized waste disposal services.

SECTION 14: TRANSPORT INFORMATION

Classification for ROAD and Rail transport (ADR/RID):

- | | |
|-----------------------------------|---|
| 14.1 UN number or ID number | UN 1950 |
| 14.2 UN proper shipping name | AEROSOLS |
| 14.3 Transport hazard class(es) | 2.1 |
| 14.4 Packing group | Not applicable |
| 14.5 Environmental hazards | Not considered environmentally hazardous based on available data. |
| 14.6 Special precautions for user | No data available. |

Classification for SEA transport (IMO-IMDG):

- | | |
|--|--|
| 14.1 UN number or ID number | UN 1950 |
| 14.2 UN proper shipping name | AEROSOLS |
| 14.3 Transport hazard class(es) | 2.1 |
| 14.4 Packing group | Not applicable |
| 14.5 Environmental hazards | Not considered as marine pollutant based on available data. |
| 14.6 Special precautions for user | EmS: F-D, S-U |
| 14.7 Maritime transport in bulk according to IMO instruments | Consult IMO regulations before transporting ocean bulk instruments |

Classification for AIR transport (IATA/ICAO):

- | | |
|-----------------------------------|---------------------|
| 14.1 UN number or ID number | UN 1950 |
| 14.2 UN proper shipping name | Aerosols, flammable |
| 14.3 Transport hazard class(es) | 2.1 |
| 14.4 Packing group | Not applicable |
| 14.5 Environmental hazards | Not applicable |
| 14.6 Special precautions for user | No data available. |

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**REACH Regulation (EC) No 1907/2006**

This product contains only components that have been either registered, are exempt from registration, are regarded as registered or are not subject to registration according 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. Polymers are exempted from registration under REACH. All relevant starting materials and additives have been either registered, or are exempt from registration according to Regulation (EC) No. 1907/2006 (REACH).

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

Listed in Regulation: FLAMMABLE AEROSOLS

Number in Regulation: P3a

150 t

500 t

Listed in Regulation: Liquefied flammable gases (including LPG) and natural gas

Number in Regulation: 18

50 t

200 t

Listed in Regulation: Petroleum products: (a) gasolines and naphthas, (b) kerosenes (including jet fuels), (c) gas oils (including diesel fuels, home heating oils and gas oil blending streams), (d) heavy fuel oils (e) alternative fuels serving the same purposes and with similar properties as regards flammability and environmental hazards as the products referred to in points (a) to (d)

Number in Regulation: 34

2,500 t

25,000 t

Further information

Take note of Directive 92/85/EEC regarding maternity protection or stricter national regulations, where applicable.

Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.

15.2 Chemical safety assessment

No Chemical Safety Assessment has been carried out for this substance/mixture.

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H220

Extremely flammable gas.

H222	Extremely flammable aerosol.
H226	Flammable liquid and vapour.
H229	Pressurised container: May burst if heated.
H280	Contains gas under pressure; may explode if heated.
H304	May be fatal if swallowed and enters airways.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause 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.
H412	Harmful to aquatic life with long lasting effects.

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) No 1272/2008

Aerosol - 1 - H222 - Based on product data or assessment

STOT RE - 2 - H373 - Calculation method

Aquatic Chronic - 3 - H412 - Calculation method

Revision

Identification Number: 12024756 / A670 / Issue Date: 13.09.2023 / Version: 8.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

2019/1831/EU	Europe. Commission Directive 2019/1831/EU establishing a fifth list of indicative occupational exposure limit values
ACGIH	USA. ACGIH Threshold Limit Values (TLV)
GB EH40	UK. EH40 WEL - Workplace Exposure Limits
STEL	Short-term exposure limit (15-minute reference period)
TWA	Long-term exposure limit (8-hour TWA reference period)
Aquatic Acute	Short-term (acute) aquatic hazard
Aquatic Chronic	Long-term (chronic) aquatic hazard
Asp. Tox.	Aspiration hazard
Eye Irrit.	Eye irritation
Flam. Gas	Flammable gases
Flam. Liq.	Flammable liquids
Press. Gas	Gases under pressure
STOT RE	Specific target organ toxicity - repeated exposure
STOT SE	Specific target organ toxicity - single exposure

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS -

Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Information Source and References

This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

SPECIALTY ELECTRONIC MATERIALS UK LIMITED urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

GB