



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

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SDS No. : 383058
V002.0

LOCTITE ABLESTIK 3230 known as Ablebond 3230 (36g),

Revision: 15.05.2019
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Replaces version from: 23.08.2017

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

LOCTITE ABLESTIK 3230 known as Ablebond 3230 (36g),

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

Intended use:

Die attach adhesive

1.3. Details of the supplier of the safety data sheet

Henkel AG & Co. KGaA
Henkelstr. 67
40589 Düsseldorf

Germany

Phone: +49 211 797 0
Fax-no.: +49 211 798 2009

ua-productsafety.de@henkel.com

1.4. Emergency telephone number

The Henkel information service also provides an around-the-clock telephone service on phone no.+49-(0)211-797-3350 for exceptional cases.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (CLP):

Serious eye irritation	Category 2
H319 Causes serious eye irritation.	
Respiratory sensitizer	Category 1
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.	
Skin sensitizer	Category 1
H317 May cause an allergic skin reaction.	
Germ cell mutagenicity	Category 2
H341 Suspected of causing genetic defects.	
Acute hazards to the aquatic environment	Category 1
H400 Very toxic to aquatic life.	
Chronic hazards to the aquatic environment	Category 1
H410 Very toxic to aquatic life with long lasting effects.	

2.2. Label elements

Label elements (CLP):

Hazard pictogram:**Contains**

Bisphenol F diglycidyl ether

Dihydro-3-(tetrapropenyl)furan-2,5-dione

2,6-Diglycidyl phenyl allyl ether oligomer

Hexahydromethylphthalic anhydride

1,4-Bis(2,3-epoxypropoxy)butane

Maleic anhydride

Signal word:

Danger

Hazard statement:

H317 May cause an allergic skin reaction.

H319 Causes serious eye irritation.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H341 Suspected of causing genetic defects.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement:**Prevention**

P261 Avoid breathing vapors.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing.

Precautionary statement:**Response**

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

P337+P313 If eye irritation persists: Get medical advice/attention.

P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor.

2.3. Other hazards

None if used properly.

Not fulfilling Persistent, Bioaccumulative and Toxic (PBT), very Persistent and very Bioaccumulative (vPvB) criteria.

SECTION 3: Composition/information on ingredients**3.2. Mixtures****General chemical description:**

Adhesive

Base substances of preparation:

Epoxy resin

Declaration of the ingredients according to CLP (EC) No 1272/2008:

Hazardous components CAS-No.	EC Number REACH-Reg No.	content	Classification
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	231-131-3 01-2119555669-21	50- 100 %	Aquatic Acute 1 H400 Aquatic Chronic 1 H410 M factor (Acute Aquat Tox): 10 M factor (Chron Aquat Tox): 10
Bisphenol F diglycidyl ether 39817-09-9	254-641-8	5- < 10 %	Skin Irrit. 2; Dermal H315 Skin Sens. 1 H317 Eye Irrit. 2 H319 Aquatic Chronic 2 H411
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	247-781-6 01-2119979080-37	5- < 10 %	Skin Sens. 1A H317 Eye Irrit. 2 H319 Aquatic Chronic 4 H413
2,6-Diglycidyl phenyl allyl ether oligomer	417-470-1	1- < 5 %	Muta. 2 H341 Skin Sens. 1 H317
Dodecyloxirane 3234-28-4	221-781-6	1- < 5 %	Skin Irrit. 2; Dermal H315 Eye Irrit. 2 H319 STOT SE 3; Inhalation H335
Hexahydromethylphthalic anhydride 25550-51-0	247-094-1 01-2119845474-33	1- < 3 %	Eye Dam. 1 H318 Skin Sens. 1 H317 Resp. Sens. 1 H334 ===== EU. REACH Candidate List of Substances of Very High Concern for Authorization (SVHC)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	219-371-7 01-2119494060-45	1- < 3 %	Acute Tox. 4 H302 Acute Tox. 4 H312 Acute Tox. 4 H332 Skin Irrit. 2 H315 Skin Sens. 1 H317 Eye Dam. 1 H318 Aquatic Chronic 3 H412
Copper oxide 1317-38-0	215-269-1	0,1- < 1 %	Aquatic Acute 1 H400 Aquatic Chronic 3 H412
Maleic anhydride 108-31-6	203-571-6 01-2119472428-31	0,0001- < 0,01 % (1 ppm- < 100 ppm)	Resp. Sens. 1 H334 Skin Sens. 1A H317 Acute Tox. 4; Oral H302 STOT RE 1; Inhalation H372 Skin Corr. 1B H314 Eye Dam. 1 H318

For full text of the H - statements and other abbreviations see section 16 "Other information".

Substances without classification may have community workplace exposure limits available.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:

Should not be a problem as product is of low volatility. However, if feeling unwell remove patient to fresh air. In case of adverse health effects seek medical advice.

Skin contact:

Rinse with running water and soap.
Obtain medical attention if irritation persists.

Eye contact:

Rinse immediately with plenty of running water (for 10 minutes), seek medical attention from a specialist.

Ingestion:

Rinse mouth, drink 1-2 glasses of water, do not induce vomiting, consult a doctor.

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

RESPIRATORY: Irritation, coughing, shortness of breath, chest tightness.

May cause allergy or asthma symptoms or breathing difficulties if inhaled.

SKIN: Rash, Urticaria.

EYE: Irritation, conjunctivitis.

Prolonged or repeated contact may cause skin irritation.

Prolonged or repeated skin contact with silver and its salts may cause a blue-gray discoloration of the skin and mucous membranes that is irreversible (Argyria).

4.3. Indication of any immediate medical attention and special treatment needed

See section: Description of first aid measures

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:

water, carbon dioxide, foam, powder

Extinguishing media which must not be used for safety reasons:

High pressure waterjet

5.2. Special hazards arising from the substance or mixture

In the event of a fire, carbon monoxide (CO), carbon dioxide (CO₂) and nitrogen oxides (NO_x) can be released. Oxides of carbon, oxides of nitrogen, irritating organic vapors.

5.3. Advice for firefighters

Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear.

Additional information:

In case of fire, keep containers cool with water spray.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid contact with skin and eyes.

Wear protective equipment.

6.2. Environmental precautions

Do not empty into drains / surface water / ground water.

6.3. Methods and material for containment and cleaning up

For small spills wipe up with paper towel and place in container for disposal.

For large spills absorb onto inert absorbent material and place in sealed container for disposal.

Dispose of contaminated material as waste according to Section 13.

6.4. Reference to other sections

See advice in section 8

SECTION 7: Handling and storage**7.1. Precautions for safe handling**

Avoid skin and eye contact.

See advice in section 8

Hygiene measures:

Good industrial hygiene practices should be observed.

Wash hands before work breaks and after finishing work.

Do not eat, drink or smoke while working.

7.2. Conditions for safe storage, including any incompatibilities

Keep container tightly sealed.

Refer to Technical Data Sheet

7.3. Specific end use(s)

Die attach adhesive

SECTION 8: Exposure controls/personal protection**8.1. Control parameters****Occupational Exposure Limits**

Valid for
Germany

Ingredient [Regulated substance]	ppm	mg/m ³	Value type	Short term exposure limit category / Remarks	Regulatory list
Silver 7440-22-4 [SILVER, METALLIC]		0,1	Time Weighted Average (TWA):	Indicative	ECLTV
Silver 7440-22-4			Short Term Exposure Classification:	Category II: substances with a resorptive effect.	TRGS 900
Silver 7440-22-4		0,1	Exposure limit(s):	8	TRGS 900
Maleic anhydride 108-31-6			Short Term Exposure Classification:	Category I: substances for which the localized effect has an assigned OEL or for substances with a sensitizing effect in respiratory passages.	TRGS 900
Maleic anhydride 108-31-6			STEL (Short Term Exposure Limit) factor:	1 Substance listed with both Peak factor and STEL factor. The Peak factor is supplied with the AGW values.	TRGS 900
Maleic anhydride 108-31-6	0,02	0,081	Exposure limit(s):	=2.5= If the AGW and BGW values are complied with, there should be no risk of reproductive damage (see Number 2.7).	TRGS 900

Predicted No-Effect Concentration (PNEC):

Name on list	Environmental Compartment	Exposure period	Value				Remarks
			mg/l	ppm	mg/kg	others	
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	aqua (freshwater)		0,00004 mg/l				
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	aqua (marine water)		0,00086 mg/l				
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	sewage treatment plant (STP)		0,025 mg/l				
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	sediment (freshwater)				438,13 mg/kg		
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	sediment (marine water)				438,13 mg/kg		
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	Air						
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	Soil				1,41 mg/kg		
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	aqua (freshwater)		0,02 mg/l				
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	sediment (freshwater)				1,7 mg/kg		
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	aqua (marine water)		0,002 mg/l				
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	sediment (marine water)				0,17 mg/kg		
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	aqua (intermittent releases)		0,2 mg/l				
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	Soil				0,2 mg/kg		
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	sewage treatment plant (STP)		10 mg/l				
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	Air						
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	Predator						
Hexahydromethylphthalic anhydride 25550-51-0	aqua (freshwater)		0,1 mg/l				
Hexahydromethylphthalic anhydride 25550-51-0	aqua (marine water)		0,01 mg/l				
Hexahydromethylphthalic anhydride 25550-51-0	sewage treatment plant (STP)		2,19 mg/l				
Hexahydromethylphthalic anhydride 25550-51-0	sediment (freshwater)				2,69 mg/kg		
Hexahydromethylphthalic anhydride 25550-51-0	sediment (marine water)				0,269 mg/kg		
Hexahydromethylphthalic anhydride 25550-51-0	Air						
Hexahydromethylphthalic anhydride 25550-51-0	Soil				0,603 mg/kg		
Maleic anhydride 108-31-6	aqua (freshwater)		0,1 mg/l				
Maleic anhydride 108-31-6	aqua (marine water)		0,01 mg/l				
Maleic anhydride 108-31-6	aqua (intermittent releases)		0,4281 mg/l				
Maleic anhydride 108-31-6	Soil		0,0415 mg/l				
Maleic anhydride 108-31-6	sediment (freshwater)				0,334 mg/kg		
Maleic anhydride 108-31-6	sediment (marine water)				0,0334 mg/kg		

Maleic anhydride 108-31-6	sewage treatment plant (STP)		44,6 mg/l				
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Derived No-Effect Level (DNEL):

Name on list	Application Area	Route of Exposure	Health Effect	Exposure Time	Value	Remarks
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	Workers	inhalation	Long term exposure - systemic effects		0,1 mg/m3	
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	General population	inhalation	Long term exposure - systemic effects		0,04 mg/m3	
Silver >= 99,9 % Ag as powder (>100nm<1mm) classified for environment 7440-22-4	General population	oral	Long term exposure - systemic effects		1,2 mg/kg	
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	Workers	dermal	Long term exposure - systemic effects		0,33 mg/kg	
Maleic anhydride 108-31-6	Workers	inhalation	Acute/short term exposure - systemic effects		0,8 mg/m3	
Maleic anhydride 108-31-6	Workers	inhalation	Acute/short term exposure - local effects		0,8 mg/m3	
Maleic anhydride 108-31-6	Workers	inhalation	Long term exposure - systemic effects		0,4 mg/m3	
Maleic anhydride 108-31-6	Workers	inhalation	Long term exposure - local effects		0,4 mg/m3	

Biological Exposure Indices:

None

8.2. Exposure controls:

Engineering controls:

Ensure good ventilation/extraction.

Respiratory protection:

Ensure adequate ventilation.

An approved mask or respirator fitted with an organic vapour cartridge should be worn if the product is used in a poorly ventilated area

Filter type: A (EN 14387)

Hand protection:

Chemical-resistant protective gloves (EN 374).

Suitable materials for short-term contact or splashes (recommended: at least protection index 2, corresponding to > 30 minutes permeation time as per EN 374):

nitrile rubber (NBR; >= 0.4 mm thickness)

Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374):

nitrile rubber (NBR; >= 0.4 mm thickness)

This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced.

Eye protection:

Safety glasses with sideshields or chemical safety goggles should be worn if there is a risk of splashing.

Protective eye equipment should conform to EN166.

Skin protection:

Wear suitable protective clothing.

Protective clothing should conform to EN 14605 for liquid splashes or to EN 13982 for dusts.

Advices to personal protection equipment:

The information provided on personal protective equipment is for guidance purposes only. A full risk assessment should be conducted prior to using this product to determine the appropriate personal protective equipment to suit local conditions. Personal protective equipment should conform to the relevant EN standard.

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties**

Appearance	paste
	grey
Odor	mild
Odour threshold	No data available / Not applicable
pH	Not applicable
Melting point	Not determined
Solidification temperature	No data available / Not applicable
Initial boiling point	Polymerization may occur at elevated temperature.
Initial boiling point	Polymerization may occur at elevated temperature.
Flash point	> 200 °C (> 392 °F)
Evaporation rate	No data available / Not applicable
Flammability	No data available / Not applicable
Explosive limits	No data available / Not applicable
Vapour pressure	No data available / Not applicable
Relative vapour density:	No data available / Not applicable
Density	3,6 g/cm ³
()	
Bulk density	No data available / Not applicable
Solubility	No data available / Not applicable
Solubility (qualitative)	Insoluble
(Solvent: Water)	
Partition coefficient: n-octanol/water	No data available / Not applicable
Auto-ignition temperature	No data available / Not applicable
Decomposition temperature	No data available / Not applicable
Viscosity	No data available / Not applicable
Viscosity (kinematic)	No data available / Not applicable
Explosive properties	No data available / Not applicable
Oxidising properties	No data available / Not applicable

9.2. Other information

No data available / Not applicable

SECTION 10: Stability and reactivity**10.1. Reactivity**

Reacts with alcohols and amines.

Reacts with oxidants, acids and lyes

Reaction with some curing agents may produce an exothermic reaction which in large masses could cause runaway polymerization.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

See section reactivity

10.4. Conditions to avoid

No decomposition if stored and applied as directed.

10.5. Incompatible materials

See section reactivity.

10.6. Hazardous decomposition products

Hydrocarbons

carbon oxides.

nitrogen oxides

Rapid polymerisation may generate excessive heat and pressure.

SECTION 11: Toxicological information**General toxicological information:**

Prolonged or repeated contact may cause skin irritation.

11.1. Information on toxicological effects**Acute oral toxicity:**

The mixture is classified based on calculation method referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Value type	Value	Species	Method
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	LD50	> 2.000 mg/kg	rat	OECD Guideline 401 (Acute Oral Toxicity)
Bisphenol F diglycidyl ether 39817-09-9	LD50	> 5.000 mg/kg	rat	
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	LD50	2.900 mg/kg	rat	OECD Guideline 423 (Acute Oral toxicity)
Dodecyloxirane 3234-28-4	LD50	> 10.000 mg/kg	rat	
Hexahydromethylphthalic anhydride 25550-51-0	LD50	> 2.000 mg/kg	rat	EU Method B.1 tris (Acute Oral Toxicity)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	LD50	1.118 mg/kg	rat	OECD Guideline 401 (Acute Oral Toxicity)
Maleic anhydride 108-31-6	LD50	1.090 mg/kg	rat	OECD Guideline 401 (Acute Oral Toxicity)

Acute dermal toxicity:

Prolonged or repeated skin contact with silver and its salts may cause a blue-gray discoloration of the skin and mucous membranes that is irreversible (Argyria).

Hazardous substances CAS-No.	Value type	Value	Species	Method
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	LD50	> 2.000 mg/kg	rat	OECD Guideline 402 (Acute Dermal Toxicity)
Bisphenol F diglycidyl ether 39817-09-9	LD50	> 6.000 mg/kg	rabbit	
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	LD50	6.200 mg/kg	rabbit	OECD Guideline 402 (Acute Dermal Toxicity)
Hexahydromethylphthalic anhydride 25550-51-0	LD50	> 2.000 mg/kg	rat	OECD Guideline 402 (Acute Dermal Toxicity)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	LD50	1.130 mg/kg	rabbit	not specified
Maleic anhydride 108-31-6	LD50	2.620 mg/kg	rabbit	not specified

Acute inhalative toxicity:

The mixture is classified based on calculation method referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Value type	Value	Test atmosphere	Exposure time	Species	Method
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	LC50	5,3 mg/l	dust/mist	4 h	rat	not specified

Skin corrosion/irritation:

The mixture is classified based on calculation method referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Result	Exposure time	Species	Method
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	not irritating		rabbit	other guideline:
Hexahydromethylphthalic anhydride 25550-51-0	moderately irritating	24 h	rabbit	other guideline:
Maleic anhydride 108-31-6	highly irritating		rabbit	OECD Guideline 404 (Acute Dermal Irritation / Corrosion)

Serious eye damage/irritation:

The mixture is classified based on calculation method referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Result	Exposure time	Species	Method
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	irritating		rabbit	Evaluated according F.H.S.A.= Federal Hazardous Substance Act.
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	Category 1 (irreversible effects on the eye)		rabbit	OECD Guideline 405 (Acute Eye Irritation / Corrosion)
Maleic anhydride 108-31-6	corrosive		rabbit	OECD Guideline 405 (Acute Eye Irritation / Corrosion)

Respiratory or skin sensitization:

The mixture is classified based on threshold limits referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Result	Test type	Species	Method
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	sensitising	Guinea pig maximisation test	guinea pig	OECD Guideline 406 (Skin Sensitisation)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	sensitising	Guinea pig maximisation test	guinea pig	OECD Guideline 406 (Skin Sensitisation)
Maleic anhydride 108-31-6	sensitising	Guinea pig maximisation test	guinea pig	OECD Guideline 406 (Skin Sensitisation)

Germ cell mutagenicity:

The mixture is classified based on threshold limits referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Result	Type of study / Route of administration	Metabolic activation / Exposure time	Species	Method
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	negative	in vitro mammalian cell micronucleus test	with and without		OECD Guideline 487 (In vitro Mammalian Cell Micronucleus Test)
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	negative	bacterial reverse mutation assay (e.g Ames test)	with and without		OECD Guideline 471 (Bacterial Reverse Mutation Assay)
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	negative	in vitro mammalian chromosome aberration test	with and without		OECD Guideline 473 (In vitro Mammalian Chromosome Aberration Test)
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	negative	mammalian cell gene mutation assay	with and without		OECD Guideline 476 (In vitro Mammalian Cell Gene Mutation Test)
2,6-Diglycidyl phenyl allyl ether oligomer	positive with metabolic activation	bacterial reverse mutation assay (e.g Ames test)			not specified
Hexahydromethylphthalic anhydride 25550-51-0	negative	bacterial reverse mutation assay (e.g Ames test)	with and without		OECD Guideline 471 (Bacterial Reverse Mutation Assay)
Hexahydromethylphthalic anhydride 25550-51-0	negative	in vitro mammalian chromosome aberration test	with and without		OECD Guideline 473 (In vitro Mammalian Chromosome Aberration Test)
Hexahydromethylphthalic anhydride 25550-51-0	negative	mammalian cell gene mutation assay	with and without		OECD Guideline 476 (In vitro Mammalian Cell Gene Mutation Test)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	positive	bacterial reverse mutation assay (e.g Ames test)	with and without		OECD Guideline 471 (Bacterial Reverse Mutation Assay)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	positive	in vitro mammalian chromosome aberration test	with and without		OECD Guideline 473 (In vitro Mammalian Chromosome Aberration Test)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	positive	mammalian cell gene mutation assay	with and without		OECD Guideline 476 (In vitro Mammalian Cell Gene Mutation Test)
Maleic anhydride 108-31-6	negative	bacterial reverse mutation assay (e.g Ames test)	with and without		OECD Guideline 471 (Bacterial Reverse Mutation Assay)
2,6-Diglycidyl phenyl allyl ether oligomer	positive	intraperitoneal			not specified
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	negative	oral: gavage		mouse	OECD Guideline 474 (Mammalian Erythrocyte Micronucleus Test)
Maleic anhydride 108-31-6	negative	inhalation		rat	OECD Guideline 475 (Mammalian Bone Marrow Chromosome Aberration Test)

Carcinogenicity

No data available.

Reproductive toxicity:

The mixture is classified based on threshold limits referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Result / Value	Test type	Route of application	Species	Method
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	NOAEL P 50 mg/kg	screening	oral: gavage	rat	OECD Guideline 421 (Reproduction / Developmental Toxicity Screening Test)
Hexahydromethylphthalic anhydride 25550-51-0	NOAEL P 450 mg/kg	screening	oral: gavage	rat	OECD Guideline 421 (Reproduction / Developmental Toxicity Screening Test)
Maleic anhydride 108-31-6	NOAEL P 55 mg/kg NOAEL F1 55 mg/kg	Two generation study	oral: gavage	rat	OECD Guideline 416 (Two-Generation Reproduction Toxicity Study)

STOT-single exposure:

No data available.

STOT-repeated exposure::

The mixture is classified based on threshold limits referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Result / Value	Route of application	Exposure time / Frequency of treatment	Species	Method
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	NOAEL 50 mg/kg	oral: gavage	28 days	rat	EPA Guideline
Hexahydromethylphthalic anhydride 25550-51-0	NOAEL 450 mg/kg	oral: gavage	28 d once a day, 7 days a week	rat	OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity in Rodents)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	NOAEL 200 mg/kg	oral: gavage	28 d daily	rat	OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity in Rodents)
Maleic anhydride 108-31-6	NOAEL 40 mg/kg	oral: feed	90 d daily	rat	not specified

Aspiration hazard:

No data available.

SECTION 12: Ecological information

General ecological information:

Do not empty into drains / surface water / ground water.

12.1. Toxicity

Toxicity (Fish):

The mixture is classified based on calculation method referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Value type	Value	Exposure time	Species	Method
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	LC50	0,0012 mg/l	96 h	Pimephales promelas	other guideline:
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	EC10	0,00019 mg/l	217 d	Salmo trutta	OECD Guideline 210 (fish early lite stage toxicity test)
Bisphenol F diglycidyl ether 39817-09-9	LC50	> 1 - 10 mg/l	96 h	not specified	OECD Guideline 203 (Fish, Acute Toxicity Test)
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	LC50		96 h	Oncorhynchus mykiss	OECD Guideline 203 (Fish, Acute Toxicity Test)
Dodecylloxirane 3234-28-4	LC50	3.200 mg/l	96 h	Brachydanio rerio (new name: Danio rerio)	not specified
Hexahydromethylphthalic anhydride 25550-51-0	LC50	500 mg/l	48 h	Oryzias latipes	OECD Guideline 203 (Fish, Acute Toxicity Test)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	LC50	24 mg/l	96 h	Brachydanio rerio (new name: Danio rerio)	OECD Guideline 203 (Fish, Acute Toxicity Test)
Maleic anhydride 108-31-6	LC50	115 mg/l			OECD Guideline 203 (Fish, Acute Toxicity Test)

Toxicity (Daphnia):

The mixture is classified based on calculation method referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Value type	Value	Exposure time	Species	Method
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	EC50	0,00022 mg/l	48 h	Daphnia magna	other guideline:
Bisphenol F diglycidyl ether 39817-09-9	EC50	> 1 - 10 mg/l	48 h	Daphnia magna	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	EC50		48 h	Daphnia magna	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
Dodecylloxirane 3234-28-4	EC50	< 900 mg/l	48 h	Daphnia magna	not specified
Hexahydromethylphthalic anhydride 25550-51-0	EC50	> 100 mg/l	48 h	Daphnia magna	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	EC50	75 mg/l	24 h	Daphnia magna	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
Maleic anhydride 108-31-6	EC50	42,81 mg/l	48 h	Daphnia magna	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)

Chronic toxicity to aquatic invertebrates

The mixture is classified based on calculation method referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Value type	Value	Exposure time	Species	Method
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	NOEC	0,00032 mg/l	21 d	Daphnia magna	EPA OPPTS 850.1300 (Daphnid Chronic Toxicity Test)

Toxicity (Algae):

The mixture is classified based on calculation method referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Value type	Value	Exposure time	Species	Method
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	EC10	0,00016 mg/l	15 d	other:	other guideline:
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	EC50		96 h	Selenastrum capricornutum (new name: Pseudokirchneriella subcapitata)	OECD Guideline 201 (Alga, Growth Inhibition Test)
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	NOEC		96 h	Selenastrum capricornutum (new name: Pseudokirchneriella subcapitata)	OECD Guideline 201 (Alga, Growth Inhibition Test)
Hexahydromethylphthalic anhydride 25550-51-0	EC50	135 mg/l	72 h	Pseudokirchneriella subcapitata	OECD Guideline 201 (Alga, Growth Inhibition Test)
Hexahydromethylphthalic anhydride 25550-51-0	NOEC	32 mg/l	72 h	Pseudokirchneriella subcapitata	OECD Guideline 201 (Alga, Growth Inhibition Test)
Maleic anhydride 108-31-6	EC50	29 mg/l	72 h	Scenedesmus subspicatus (new name: Desmodesmus subspicatus)	OECD Guideline 201 (Alga, Growth Inhibition Test)
Maleic anhydride 108-31-6	EC10	23 mg/l	72 h	Scenedesmus subspicatus (new name: Desmodesmus subspicatus)	OECD Guideline 201 (Alga, Growth Inhibition Test)

Toxicity to microorganisms

The mixture is classified based on calculation method referring to the classified substances present in the mixture.

Hazardous substances CAS-No.	Value type	Value	Exposure time	Species	Method
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	EC50		3 h	activated sludge, domestic	OECD Guideline 209 (Activated Sludge, Respiration Inhibition Test)
Dodecyloxirane 3234-28-4	EC0	10.000 mg/l	30 min		not specified
Hexahydromethylphthalic anhydride 25550-51-0	EC20	95,3 mg/l	3 h	activated sludge, domestic	OECD Guideline 209 (Activated Sludge, Respiration Inhibition Test)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	EC 50	> 100 mg/l	3 h		OECD Guideline 209 (Activated Sludge, Respiration Inhibition Test)
Maleic anhydride 108-31-6	EC0	> 10.000 mg/l	30 min		not specified

12.2. Persistence and degradability

The product is not biodegradable.

Hazardous substances CAS-No.	Result	Test type	Degradability	Exposure time	Method
Bisphenol F diglycidyl ether 39817-09-9	not readily biodegradable.	aerobic	< 10 %	28 d	OECD 301 A - F
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	not readily biodegradable.	aerobic	9,9 %	28 d	OECD Guideline 301 D (Ready Biodegradability: Closed Bottle Test)
Dodecyloxirane 3234-28-4		aerobic	92 %	28 d	ISO 10708 (BODIS-Test)
Hexahydromethylphthalic anhydride 25550-51-0	not readily biodegradable.	aerobic	2 %	28 d	OECD Guideline 301 F (Ready Biodegradability: Manometric Respirometry Test)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8		aerobic	38 %	28 d	OECD Guideline 301 E (Ready biodegradability: Modified OECD Screening Test)
Maleic anhydride 108-31-6	readily biodegradable	aerobic	98 %	7 d	OECD Guideline 301 E (Ready biodegradability: Modified OECD Screening Test)

12.3. Bioaccumulative potential

No data available.

Hazardous substances CAS-No.	Bioconcentration factor (BCF)	Exposure time	Temperature	Species	Method
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	70	42 d	20 °C	Cyprinus carpio	other guideline:
Hexahydromethylphthalic anhydride 25550-51-0	11,12			calculated	QSAR (Quantitative Structure Activity Relationship)

12.4. Mobility in soil

Cured adhesives are immobile.

Hazardous substances CAS-No.	LogPow	Temperature	Method
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	4,39	22 °C	OECD Guideline 107 (Partition Coefficient (n-octanol / water), Shake Flask Method)
Hexahydromethylphthalic anhydride 25550-51-0	2,59	25 °C	QSAR (Quantitative Structure Activity Relationship)
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	-0,269	25 °C	OECD Guideline 117 (Partition Coefficient (n-octanol / water), HPLC Method)
Maleic anhydride 108-31-6	1,62		not specified

12.5. Results of PBT and vPvB assessment

Hazardous substances CAS-No.	PBT / vPvB
Silver >= 99,9 % Ag in powder (>100nm<1mm) 7440-22-4	Not fulfilling Persistent, Bioaccumulative and Toxic (PBT), very Persistent and very Bioaccumulative (vPvB) criteria.
Dihydro-3-(tetrapropenyl)furan-2,5-dione 26544-38-7	Not fulfilling Persistent, Bioaccumulative and Toxic (PBT), very Persistent and very Bioaccumulative (vPvB) criteria.
Hexahydromethylphthalic anhydride 25550-51-0	Not fulfilling Persistent, Bioaccumulative and Toxic (PBT), very Persistent and very Bioaccumulative (vPvB) criteria.
1,4-Bis(2,3-epoxypropoxy)butane 2425-79-8	Not fulfilling Persistent, Bioaccumulative and Toxic (PBT), very Persistent and very Bioaccumulative (vPvB) criteria.
Copper oxide 1317-38-0	According to Annex XIII of regulation (EC) 1907/2006 a PBT and vPvB assessment shall not be conducted for inorganic substances.
Maleic anhydride 108-31-6	Not fulfilling Persistent, Bioaccumulative and Toxic (PBT), very Persistent and very Bioaccumulative (vPvB) criteria.

12.6. Other adverse effects

No data available.

SECTION 13: Disposal considerations**13.1. Waste treatment methods**

Product disposal:

Do not empty into drains / surface water / ground water.

Dispose of in accordance with local and national regulations.

Disposal of uncleaned packages:

After use, tubes, cartons and bottles containing residual product should be disposed of as chemically contaminated waste in an authorised legal land fill site or incinerated.

Waste code

08 04 09 waste adhesives and sealants containing organic solvents and other dangerous substances

The valid EWC waste code numbers are source-related. The manufacturer is therefore unable to specify EWC waste codes for the articles or products used in the various sectors. The EWC codes listed are intended as a recommendation for users. We will be happy to advise you.

SECTION 14: Transport information

14.1. UN number

ADR	3077
RID	3077
ADN	3077
IMDG	3077
IATA	3077

14.2. UN proper shipping name

ADR	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Silver)
RID	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Silver)
ADN	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Silver)
IMDG	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Silver)
IATA	Environmentally hazardous substance, solid, n.o.s. (Silver)

14.3. Transport hazard class(es)

ADR	9
RID	9
ADN	9
IMDG	9
IATA	9

14.4. Packing group

ADR	III
RID	III
ADN	III
IMDG	III
IATA	III

14.5. Environmental hazards

ADR	not applicable
RID	not applicable
ADN	not applicable
IMDG	Marine pollutant
IATA	not applicable

14.6. Special precautions for user

ADR	not applicable Tunnelcode:
RID	not applicable
ADN	not applicable
IMDG	not applicable
IATA	not applicable

The transport classifications in this section apply generally to packed and bulk goods alike. For containers with a net volume of no more than 5 L for liquid substances or a net mass of no more than 5 kg for solid substances per individual or inner package, the exemptions SP 375 (ADR), 197 (IATA), 969 (IMDG) may be applied, which can result in a deviation from the transport classification for packed goods.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

VOC content < 3 %
(2010/75/EC)

15.2. Chemical safety assessment

A chemical safety assessment has not been carried out.

National regulations/information (Germany):

WGK: WGK = 3, highly water endangering mixture. Classification according to the mixture rules in German AwSV regulation annex 1, number 5.2 from 18. April 2017.

Storage class according to TRGS 510: 11

SECTION 16: Other information

The labelling of the product is indicated in Section 2. The full text of all abbreviations indicated by codes in this safety data sheet are as follows:

H302 Harmful if swallowed.
H312 Harmful in contact with skin.
H314 Causes severe skin burns and eye damage.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335 May cause respiratory irritation.
H341 Suspected of causing genetic defects.
H372 Causes damage to organs through prolonged or repeated exposure if inhaled.
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.
H413 May cause long lasting harmful effects to aquatic life.

Further information:

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This information is based on our current level of knowledge and relates to the product in the state in which it is delivered. It is intended to describe our products from the point of view of safety requirements and is not intended to guarantee any particular properties.

Relevant changes in this safety data sheet are indicated by vertical lines at the left margin in the body of this document. Corresponding text is displayed in a different color on shadowed fields.