

Vitamin C (>10%) Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 03.02.2025
2.0	14.04.2025	11506185-00002	Date of first issue: 03.02.2025

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifier**

Trade name : Vitamin C (>10%) Formulation

Product code : AQUA C FISH PLUS

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

Use of the Sub-stance/Mixture : Veterinary product

Recommended restrictions on use : Not applicable

1.3 Details of the supplier of the safety data sheet

Company : MSD
20 Spartan Road
1619 Spartan, South Africa

Telephone : +27119239300

E-mail address of person responsible for the SDS : EHSDATASTEWARD@msd.com

1.4 Emergency telephone number

+1-908-423-6000

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****Classification (REGULATION (EC) No 1272/2008)**

Serious eye damage, Category 1	H318: Causes serious eye damage.
Specific target organ toxicity - single exposure, Category 3	H335: May cause respiratory irritation.

2.2 Label elements**Labelling (REGULATION (EC) No 1272/2008)**

Hazard pictograms :



Signal word : Danger

Hazard statements : H318 Causes serious eye damage.
H335 May cause respiratory irritation.

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Precautionary statements :

Prevention:

P261 Avoid breathing dust.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear eye protection/ face protection.

Response:

P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.

Storage:

P405 Store locked up.

Hazardous components which must be listed on the label:

Citric acid
Calcium diformate
Phosphoric acid

Additional Labelling

EUH208 Contains Dimethyl octadienol, 3,7-Dimethyl 2,6-octadienal. May produce an allergic reaction.

The following percentage of the mixture consists of ingredient(s) with unknown acute oral toxicity: 1,25 %

The following percentage of the mixture consists of ingredient(s) with unknown acute dermal toxicity: 1,25 %

The following percentage of the mixture consists of ingredient(s) with unknown acute inhalation toxicity: 1,25 %

The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 1,25 %

2.3 Other hazards

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.

Contact with dust can cause mechanical irritation or drying of the skin.

May form explosive dust-air mixture during processing, handling or other means.

SECTION 3: Composition/information on ingredients**3.2 Mixtures****Components**

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
Citric acid	77-92-9	Eye Irrit. 2; H319	>= 20 - < 30

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	201-069-1 607-750-00-3	STOT SE 3; H335	
Calcium diformate	544-17-2 208-863-7	Eye Dam. 1; H318	$\geq 3 - < 10$
Phosphoric acid	7664-38-2 231-633-2 015-011-00-6	Met. Corr. 1; H290 Acute Tox. 4; H302 Skin Corr. 1B; H314 Eye Dam. 1; H318	$\geq 1 - < 3$
Formic acid	64-18-6 200-579-1 607-001-00-0	Flam. Liq. 3; H226 Met. Corr. 1; H290 Acute Tox. 4; H302 Acute Tox. 3; H331 Skin Corr. 1A; H314 Eye Dam. 1; H318	$\geq 0,1 - < 1$
Dimethyl octadienol	78-70-6 201-134-4 603-235-00-2	Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1B; H317	$\geq 0,1 - < 1$
3,7-Dimethyl 2,6-octadienal	5392-40-5 226-394-6 605-019-00-3	Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1; H317	$\geq 0,1 - < 1$
Substances with a workplace exposure limit :			
Ascorbic acid	50-81-7 200-066-2		$\geq 10 - < 20$

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.
- Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists (see section 8).
- If inhaled : If inhaled, remove to fresh air.
Get medical attention if symptoms occur.
- In case of skin contact : In case of contact, immediately flush skin with soap and plenty of water.
Remove contaminated clothing and shoes.
Get medical attention.
Wash clothing before reuse.

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Thoroughly clean shoes before reuse.

In case of eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.
If easy to do, remove contact lens, if worn.
Get medical attention immediately.

If swallowed : If swallowed, DO NOT induce vomiting.
Get medical attention if symptoms occur.
Rinse mouth thoroughly with water.

4.2 Most important symptoms and effects, both acute and delayed

Risks : Contact with dust can cause mechanical irritation or drying of the skin.

May produce an allergic reaction.

Causes serious eye damage.
May cause respiratory irritation.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically and supportively.

SECTION 5: Firefighting measures**5.1 Extinguishing media**

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

Unsuitable extinguishing media : None known.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting : Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Exposure to combustion products may be a hazard to health.

Hazardous combustion products : Carbon oxides
Metal oxides
Oxides of phosphorus

5.3 Advice for firefighters

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

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

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Use water spray to cool unopened containers.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Personal precautions : Use personal protective equipment.
Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

6.2 Environmental precautions

Environmental precautions : Avoid release to the environment.
Prevent further leakage or spillage if safe to do so.
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Surround spill with absorbents and place a damp covering over the area to minimise entry of the material into the air.
Add excess liquid to allow the material to enter into solution.
Soak up with inert absorbent material.
Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air).
Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration.
Clean up remaining materials from spill with suitable absorbent.
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.
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**

Technical measures : Static electricity may accumulate and ignite suspended dust causing an explosion.
Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.

Local/Total ventilation : If sufficient ventilation is unavailable, use with local exhaust ventilation.

Advice on safe handling : Do not get on skin or clothing.

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Avoid breathing dust.
Do not swallow.
Do not get in eyes.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment
Keep container tightly closed.
Already sensitised individuals, and those susceptible to asthma, allergies, chronic or recurrent respiratory disease, should consult their physician regarding working with respiratory irritants or sensitisers.
Minimize dust generation and accumulation.
Keep container closed when not in use.
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.

Hygiene measures : If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place. When using do not eat, drink or smoke. Contaminated work clothing should not be allowed out of the workplace.
Wash contaminated clothing before re-use.
The effective operation of a facility should include review of engineering controls, proper personal protective equipment, appropriate degowning and decontamination procedures, industrial hygiene monitoring, medical surveillance and the use of administrative controls.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep in properly labelled containers. Store locked up. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations.

Advice on common storage : Do not store with the following product types:
Strong oxidizing agents

7.3 Specific end use(s)

Specific use(s) : No data available

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Starch	9005-25-8	OEL-RL	10 mg/m ³	ZA OEL
Further information: Occupational Exposure Limits - Restricted Limits For Hazardous Chemical Agents				
Ascorbic acid	50-81-7	TWA	5000 µg/m ³ (OEB 1)	Internal
Phosphoric acid	7664-38-2	OEL-RL	2 mg/m ³	ZA OEL
Further information: Occupational Exposure Limits - Restricted Limits For Hazardous Chemical Agents				

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		OEL- RL STEL/C	6 mg/m ³	ZA OEL
	Further information: Occupational Exposure Limits - Restricted Limits For Hazardous Chemical Agents			
		TWA	1 mg/m ³	2000/39/EC
		STEL	2 mg/m ³	2000/39/EC
Formic acid	64-18-6	OEL-RL	10 ppm	ZA OEL
	Further information: Occupational Exposure Limits - Restricted Limits For Hazardous Chemical Agents			
		OEL- RL STEL/C	20 ppm	ZA OEL
	Further information: Occupational Exposure Limits - Restricted Limits For Hazardous Chemical Agents			
		TWA	5 ppm 9 mg/m ³	2006/15/EC

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006

Substance name	End Use	Exposure routes	Potential health effects	Value
Calcium diformate	Workers	Inhalation	Long-term systemic effects	337 mg/m ³
	Workers	Skin contact	Long-term systemic effects	4780 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	83,2 mg/m ³
	Consumers	Skin contact	Long-term systemic effects	2390 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	23,9 mg/kg bw/day
Phosphoric acid	Workers	Inhalation	Long-term local effects	1 mg/m ³
	Workers	Inhalation	Acute local effects	2 mg/m ³
	Consumers	Inhalation	Long-term local effects	0,73 mg/m ³
Dimethyl octadienol	Workers	Inhalation	Long-term systemic effects	24,58 mg/m ³
	Workers	Skin contact	Long-term systemic effects	3,5 mg/kg bw/day
	Workers	Skin contact	Long-term local effects	3 mg/cm ²
	Workers	Skin contact	Acute local effects	3 mg/cm ²
	Consumers	Inhalation	Long-term systemic effects	4,33 mg/m ³
	Consumers	Skin contact	Long-term systemic effects	1,25 mg/kg bw/day
	Consumers	Skin contact	Long-term local effects	1,5 mg/cm ²
	Consumers	Skin contact	Acute local effects	1,5 mg/cm ²
	Consumers	Ingestion	Long-term systemic effects	2,49 mg/kg bw/day
3,7-Dimethyl 2,6-octadienal	Workers	Inhalation	Long-term systemic effects	9 mg/m ³
	Workers	Skin contact	Long-term systemic effects	1,7 mg/kg bw/day
	Workers	Skin contact	Long-term local effects	0,140 mg/cm ²

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			fects	
	Consumers	Inhalation	Long-term systemic effects	2,7 mg/m3
	Consumers	Skin contact	Long-term systemic effects	1 mg/kg bw/day
	Consumers	Skin contact	Long-term local effects	0,140 mg/cm2
	Consumers	Ingestion	Long-term systemic effects	0,6 mg/kg bw/day
Formic acid	Workers	Inhalation	Long-term systemic effects	9,5 mg/m3
	Workers	Inhalation	Long-term local effects	9,5 mg/m3
	Consumers	Inhalation	Long-term systemic effects	6 mg/m3
	Consumers	Inhalation	Long-term local effects	6 mg/m3
	Consumers	Skin contact	Long-term systemic effects	3 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	3 mg/kg bw/day

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006

Substance name	Environmental Compartment	Value
Citric acid	Fresh water	0,44 mg/l
	Marine water	0,044 mg/l
	Sewage treatment plant	1000 mg/l
	Fresh water sediment	34,6 mg/kg dry weight (d.w.)
	Marine sediment	3,46 mg/kg dry weight (d.w.)
Calcium diformate	Soil	33,1 mg/kg dry weight (d.w.)
	Fresh water	2 mg/l
	Marine water	0,2 mg/l
	Intermittent use/release	10 mg/l
	Sewage treatment plant	2,21 mg/l
Dimethyl octadienol	Fresh water sediment	13,4 mg/l
	Marine sediment	1,34 mg/l
	Soil	1,5 mg/l
	Fresh water	0,2 mg/l
	Freshwater - intermittent	2 mg/l
3,7-Dimethyl 2,6-octadienal	Marine water	0,02 mg/l
	Sewage treatment plant	10 mg/l
	Fresh water sediment	2,22 mg/kg dry weight (d.w.)
	Marine sediment	0,222 mg/kg dry weight (d.w.)
	Soil	0,327 mg/kg dry weight (d.w.)
Secondary Poisoning	Secondary Poisoning	7,8 mg/kg food
	Fresh water	0,007 mg/l
	Freshwater - intermittent	0,068 mg/l
	Marine water	0,001 mg/l

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	Sewage treatment plant	1,6 mg/l
	Fresh water sediment	0,125 mg/kg dry weight (d.w.)
	Marine sediment	0,013 mg/kg dry weight (d.w.)
	Soil	0,021 mg/kg dry weight (d.w.)

8.2 Exposure controls

Engineering measures

All engineering controls should be implemented by facility design and operated in accordance with GMP principles to protect products, workers, and the environment. Containment technologies suitable for controlling compounds are required to control at source and to prevent migration of the compound to uncontrolled areas (e.g., open-face containment devices).

Minimize open handling.

Personal protective equipment

Eye/face protection	:	Wear safety glasses with side shields or goggles. If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles. Wear a faceshield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.
Hand protection	:	
Material	:	Chemical-resistant gloves
Remarks	:	Consider double gloving.
Skin and body protection	:	Work uniform or laboratory coat. Additional body garments should be used based upon the task being performed (e.g., sleevelets, apron, gauntlets, disposable suits) to avoid exposed skin surfaces. Use appropriate degowning techniques to remove potentially contaminated clothing.
Respiratory protection	:	If adequate local exhaust ventilation is not available or exposure assessment demonstrates exposures outside the recommended guidelines, use respiratory protection.
Filter type	:	Combined particulates, acidic and inorganic gas/vapour type (BE-P)

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	:	powder
Colour	:	No data available
Odour	:	No data available
Odour Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling	:	No data available

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range	
Flash point	: Not applicable
Evaporation rate	: Not applicable
Flammability (solid, gas)	: May form explosive dust-air mixture during processing, handling or other means.
Flammability (liquids)	: Not applicable
Upper explosion limit / Upper flammability limit	: No data available
Lower explosion limit / Lower flammability limit	: No data available
Vapour pressure	: Not applicable
Relative vapour density	: Not applicable
Relative density	: No data available
Density	: No data available
Solubility(ies)	
Water solubility	: No data available
Partition coefficient: n-octanol/water	: Not applicable
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	
Viscosity, kinematic	: Not applicable
Explosive properties	: Not explosive
Oxidizing properties	: The substance or mixture is not classified as oxidizing.

9.2 Other information

Molecular weight	: No data available
Particle size	: No data available

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

Not classified as a reactivity hazard.

10.2 Chemical stability

Stable under normal conditions.

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10.3 Possibility of hazardous reactions

Hazardous reactions : May form explosive dust-air mixture during processing, handling or other means.
Can react with strong oxidizing agents.

10.4 Conditions to avoid

Conditions to avoid : Heat, flames and sparks.
Avoid dust formation.

10.5 Incompatible materials

Materials to avoid : Oxidizing agents

10.6 Hazardous decomposition products

No hazardous decomposition products are known.

SECTION 11: Toxicological information**11.1 Information on toxicological effects**

Information on likely routes of exposure : Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity

|| Not classified based on available information.

Product:

Acute oral toxicity : Acute toxicity estimate: > 2.000 mg/kg
Method: Calculation method

Acute inhalation toxicity : Acute toxicity estimate: > 20 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Method: Calculation method

Components:**Citric acid:**

Acute oral toxicity : LD50 (Mouse): 5.400 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Calcium diformate:

Acute oral toxicity : LD50 (Rat): > 2.000 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

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Remarks: Based on data from similar materials

Phosphoric acid:

Acute oral toxicity : LD50 (Rat): 2.000 mg/kg
Method: OECD Test Guideline 423

Acute inhalation toxicity : Assessment: Corrosive to the respiratory tract.

Formic acid:

Acute oral toxicity : Acute toxicity estimate (Humans): 500 mg/kg
Method: Expert judgement

Acute inhalation toxicity : LC50 (Rat): 7,4 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Assessment: Corrosive to the respiratory tract.

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg
Remarks: Based on data from similar materials

Dimethyl octadienol:

Acute oral toxicity : LD50 (Rat): 2.790 mg/kg
Method: OECD Test Guideline 401
Remarks: The test was conducted equivalent or similar to guideline

Acute inhalation toxicity : LC50 (Mouse): > 3,2 mg/l
Exposure time: 90 min
Test atmosphere: vapour
Remarks: No test guideline followed

Acute dermal toxicity : LD50 (Rabbit): 5.610 mg/kg
Method: OECD Test Guideline 402
Remarks: The test was conducted equivalent or similar to guideline

3,7-Dimethyl 2,6-octadienal:

Acute oral toxicity : LD50 (Rat, female): 4.895 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 0,68 mg/l
Exposure time: 7 h
Test atmosphere: vapour

Acute dermal toxicity : LD50 (Rabbit): 2.250 mg/kg

Ascorbic acid:

Acute oral toxicity : LD50 (Rat): 11.900 mg/kg

Skin corrosion/irritation

Not classified based on available information.

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Components:**Citric acid:**

Species	:	Rabbit
Method	:	OECD Test Guideline 404
Result	:	No skin irritation

Calcium diformate:

Species	:	Rabbit
Method	:	OECD Test Guideline 404
Result	:	No skin irritation

Phosphoric acid:

Result	:	Corrosive after 3 minutes to 1 hour of exposure
Remarks	:	Based on national or regional regulation.

Formic acid:

Result	:	Corrosive after 3 minutes or less of exposure
Remarks	:	Based on extreme pH

Dimethyl octadienol:

Species	:	Rabbit
Method	:	OECD Test Guideline 404
Result	:	Skin irritation
Remarks	:	The test was conducted according to guideline

3,7-Dimethyl 2,6-octadienal:

Species	:	Rabbit
Result	:	Skin irritation

Ascorbic acid:

Species	:	Rabbit
Method	:	OECD Test Guideline 404
Result	:	No skin irritation

Serious eye damage/eye irritation**||** Causes serious eye damage.**Components:****Citric acid:**

Species	:	Rabbit
Method	:	OECD Test Guideline 405
Result	:	Irritation to eyes, reversing within 21 days

Calcium diformate:

Species	:	Rabbit
Method	:	OECD Test Guideline 405
Result	:	Irreversible effects on the eye

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Phosphoric acid:

Species	: Rabbit
Result	: Irreversible effects on the eye

Formic acid:

Result	: Irreversible effects on the eye
Remarks	: Based on skin corrosivity.

Dimethyl octadienol:

Species	: Rabbit
Method	: OECD Test Guideline 405
Result	: Irritation to eyes, reversing within 21 days
Remarks	: The test was conducted equivalent or similar to guideline

3,7-Dimethyl 2,6-octadienal:

Species	: Rabbit
Result	: Irritation to eyes, reversing within 21 days

Ascorbic acid:

Species	: Rabbit
Method	: OECD Test Guideline 405
Result	: No eye irritation

Respiratory or skin sensitisation**Skin sensitisation**

|| Not classified based on available information.

Respiratory sensitisation

|| Not classified based on available information.

Components:**Calcium diformate:**

Test Type	: Maximisation Test
Exposure routes	: Skin contact
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: negative
Remarks	: Based on data from similar materials

Formic acid:

Test Type	: Buehler Test
Exposure routes	: Skin contact
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: negative

Dimethyl octadienol:

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Test Type	: Local lymph node assay (LLNA)
Exposure routes	: Skin contact
Species	: Mouse
Method	: OECD Test Guideline 429
Result	: positive
Remarks	: The test was conducted according to guideline
Assessment	: Probability or evidence of low to moderate skin sensitisation rate in humans

3,7-Dimethyl 2,6-octadienal:

Test Type	: Human repeat insult patch test (HRIPT)
Exposure routes	: Skin contact
Result	: positive
Assessment	: Probability or evidence of skin sensitisation in humans

Ascorbic acid:

Test Type	: Maurer optimisation test
Exposure routes	: Skin contact
Species	: Guinea pig
Result	: negative

Germ cell mutagenicity

|| Not classified based on available information.

Components:**Citric acid:**

Genotoxicity in vitro	: Test Type: Bacterial reverse mutation assay (AMES) Result: negative
	Test Type: in vitro micronucleus test Result: positive
	Test Type: Bacterial reverse mutation assay (AMES) Result: negative
Genotoxicity in vivo	: Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis) Species: Rat Application Route: Ingestion Result: negative

Calcium diformate:

Genotoxicity in vitro	: Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negative
Genotoxicity in vivo	: Test Type: Sex-linked recessive lethal test in Drosophila melanogaster (in vivo) Application Route: Ingestion

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Result: negative
Remarks: Based on data from similar materials

Phosphoric acid:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

Formic acid:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Sex-linked recessive lethal test in *Drosophila melanogaster* (in vivo)
Application Route: Ingestion
Method: OECD Test Guideline 477
Result: negative

Dimethyl octadienol:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative
Remarks: The test was conducted equivalent or similar to guideline

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: The test was conducted equivalent or similar to guideline

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative
Remarks: The test was conducted equivalent or similar to guideline

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: The test was conducted according to guideline

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3,7-Dimethyl 2,6-octadienal:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

Test Type: In vitro sister chromatid exchange assay in mammalian cells
Result: positive

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Result: negative

Ascorbic acid:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Result: negative

Carcinogenicity

|| Not classified based on available information.

Components:**Formic acid:**

Species : Rat
Application Route : Ingestion
Exposure time : 104 weeks
Result : negative
Remarks : Based on data from similar materials

3,7-Dimethyl 2,6-octadienal:

Species : Mouse

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Application Route : Ingestion
Exposure time : 104 - 105 weeks
Result : negative

Ascorbic acid:

Species : Mouse
Application Route : Ingestion
Exposure time : 2 Years
Result : negative

Reproductive toxicity

|| Not classified based on available information.

Components:**Citric acid:**

Effects on foetal development : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative

Calcium diformate:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 416
Result: negative
Remarks: Based on data from similar materials

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rabbit
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative
Remarks: Based on data from similar materials

Phosphoric acid:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on foetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Formic acid:

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Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 416
Result: negative
Remarks: Based on data from similar materials

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rabbit
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative
Remarks: Based on data from similar materials

Dimethyl octadienol:

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: No test guideline followed

3,7-Dimethyl 2,6-octadienal:

Effects on fertility : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 443
Result: negative

Effects on foetal development : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 443
Result: negative

Ascorbic acid:

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rat
Application Route: Ingestion
Result: negative

STOT - single exposure

|| May cause respiratory irritation.

Components:**Citric acid:**

Assessment : May cause respiratory irritation.

STOT - repeated exposure

|| Not classified based on available information.

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Repeated dose toxicity**Components:****Citric acid:**

Species	: Rat
NOAEL	: 4.000 mg/kg
LOAEL	: 8.000 mg/kg
Application Route	: Ingestion
Exposure time	: 10 Days

Calcium diformate:

Species	: Rat
NOAEL	: 3.000 mg/kg
Application Route	: Ingestion
Exposure time	: 13 Weeks
Method	: OECD Test Guideline 408
Remarks	: Based on data from similar materials

Phosphoric acid:

Species	: Rat
NOAEL	: 250 mg/kg
Application Route	: Ingestion
Exposure time	: 40 - 52 Days
Method	: OECD Test Guideline 422

Formic acid:

Species	: Rat
NOAEL	: 400 mg/kg
Application Route	: Ingestion
Exposure time	: 52 Weeks
Remarks	: Based on data from similar materials

Dimethyl octadienol:

Species	: Rat, male
NOAEL	: >= 497,9 mg/kg
Application Route	: Ingestion
Exposure time	: 96 Days
Method	: OECD Test Guideline 408
Remarks	: The test was conducted according to guideline

Species	: Rat
NOAEL	: 250 mg/kg
Application Route	: Skin contact
Exposure time	: 91 Days
Method	: OECD Test Guideline 411
Remarks	: The test was conducted equivalent or similar to guideline

3,7-Dimethyl 2,6-octadienal:

Species	: Rat, female
LOAEL	: 335 mg/kg

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Application Route : Ingestion
Exposure time : 14 Weeks

Ascorbic acid:

Species : Rat, male
NOAEL : ≥ 8.100 mg/kg
Application Route : Ingestion
Exposure time : 13 Weeks

Aspiration toxicity

|| Not classified based on available information.

SECTION 12: Ecological information

12.1 Toxicity

Components:

Citric acid:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): > 100 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 1.535 mg/l
Exposure time: 24 h

Calcium diformate:

Toxicity to fish : LC0 (Danio rerio (zebra fish)): ≥ 1.000 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 1.000 mg/l
Exposure time: 48 h
Method: EPA-660/3-75-009
Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 1.000 mg/l
Exposure time: 72 h
Remarks: Based on data from similar materials

NOEC (Pseudokirchneriella subcapitata (green algae)): 500 mg/l
Exposure time: 72 h
Remarks: Based on data from similar materials

Toxicity to microorganisms : NOEC : $\geq 22,1$ mg/l
Exposure time: 28 d
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: ≥ 100 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Method: OECD Test Guideline 211

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Remarks: Based on data from similar materials

Phosphoric acid:

- Toxicity to fish : LC50 (*Oryzias latipes* (Japanese medaka)): > 100 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
- Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): > 100 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
- Toxicity to algae/aquatic plants : ErC50 (*Desmodesmus subspicatus* (green algae)): > 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
- NOEC (*Desmodesmus subspicatus* (green algae)): > 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
- Toxicity to microorganisms : EC50 : > 100 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209
Remarks: Based on data from similar materials

Formic acid:

- Toxicity to fish : LC50 (*Danio rerio* (zebra fish)): 130 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: Based on data from similar materials
- Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 365 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: Based on data from similar materials
- Toxicity to algae/aquatic plants : ErC50 (*Pseudokirchneriella subcapitata* (green algae)): 1.240 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials
- EC10 (*Pseudokirchneriella subcapitata* (green algae)): 295 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials
- Toxicity to microorganisms : NOEC : 72 mg/l
Exposure time: 13 d
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: > 100 mg/l
Exposure time: 21 d
Species: *Daphnia magna* (Water flea)
Method: OECD Test Guideline 211

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Dimethyl octadienol:

- Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 27,8 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: The test was conducted according to guideline
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 59 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: The test was conducted according to guideline
- Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): 156,7 mg/l
Exposure time: 96 h

EC10 (Desmodesmus subspicatus (green algae)): 54,3 mg/l
Exposure time: 96 h
- Toxicity to microorganisms : EC10 (activated sludge): > 100 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209
Remarks: The test was conducted according to guideline

3,7-Dimethyl 2,6-octadienal:

- Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 6,78 mg/l
Exposure time: 96 h
Method: DIN 38412
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 6,8 mg/l
Exposure time: 48 h
- Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): 103,8 mg/l
Exposure time: 72 h

EC10 (Desmodesmus subspicatus (green algae)): 3 mg/l
Exposure time: 72 h
- Toxicity to microorganisms : EC50 (activated sludge): 160 mg/l
Exposure time: 30 min
Method: OECD Test Guideline 209

Ascorbic acid:

- Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 1.020 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
- Toxicity to microorganisms : EC50 : 140 mg/l
Exposure time: 16 h
Method: DIN 38 412 Part 8

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12.2 Persistence and degradability**Components:****Citric acid:**

Biodegradability : Result: Readily biodegradable.
Biodegradation: 97 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Calcium diformate:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 86 %
Exposure time: 28 d
Method: OECD Test Guideline 306
Remarks: Based on data from similar materials

Formic acid:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 100 %
Exposure time: 28 d
Method: OECD Test Guideline 301C

Dimethyl octadienol:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 64,2 %
Exposure time: 28 d
Method: OECD Test Guideline 301D
Remarks: The test was conducted according to guideline

3,7-Dimethyl 2,6-octadienal:

Biodegradability : Result: Readily biodegradable.
Biodegradation: > 90 %
Exposure time: 28 d
Method: Directive 67/548/EEC Annex V, C.4.D.

Ascorbic acid:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 97 %
Exposure time: 5 d
Method: OECD Test Guideline 302

12.3 Bioaccumulative potential**Components:****Citric acid:**

Partition coefficient: n-octanol/water : log Pow: -1,72

Calcium diformate:

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Partition coefficient: n-octanol/water : log Pow: -2,3 - -1,9
Remarks: Based on data from similar materials

Formic acid:

Partition coefficient: n-octanol/water : log Pow: -2,1

Dimethyl octadienol:

Partition coefficient: n-octanol/water : log Pow: 2,84
Method: OECD Test Guideline 107
Remarks: The test was conducted equivalent or similar to guideline

3,7-Dimethyl 2,6-octadienal:

Partition coefficient: n-octanol/water : log Pow: 2,76

Ascorbic acid:

Partition coefficient: n-octanol/water : log Pow: -1,85

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment**Product:**

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.

12.6 Other adverse effects**Product:**

Endocrine disrupting potential : 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.

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

Product : Dispose of in accordance with local regulations.
According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.
Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
Do not dispose of waste into sewer.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.

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If not otherwise specified: Dispose of as unused product.

SECTION 14: Transport information**14.1 UN number**

ADN	:	Not regulated as a dangerous good
ADR	:	Not regulated as a dangerous good
RID	:	Not regulated as a dangerous good
IMDG	:	Not regulated as a dangerous good
IATA	:	Not regulated as a dangerous good

14.2 UN proper shipping name

ADN	:	Not regulated as a dangerous good
ADR	:	Not regulated as a dangerous good
RID	:	Not regulated as a dangerous good
IMDG	:	Not regulated as a dangerous good
IATA	:	Not regulated as a dangerous good

14.3 Transport hazard class(es)

ADN	:	Not regulated as a dangerous good
ADR	:	Not regulated as a dangerous good
RID	:	Not regulated as a dangerous good
IMDG	:	Not regulated as a dangerous good
IATA	:	Not regulated as a dangerous good

14.4 Packing group

ADN	:	Not regulated as a dangerous good
ADR	:	Not regulated as a dangerous good
RID	:	Not regulated as a dangerous good
IMDG	:	Not regulated as a dangerous good
IATA (Cargo)	:	Not regulated as a dangerous good
IATA (Passenger)	:	Not regulated as a dangerous good

14.5 Environmental hazards

Not regulated as a dangerous good

14.6 Special precautions for user

Not applicable

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

Remarks : Not applicable for product as supplied.

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SECTION 15: Regulatory information**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

The components of this product are reported in the following inventories:

AICS	:	not determined
DSL	:	not determined
IECSC	:	not determined

15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

Other information	:	Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.
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Full text of H-Statements

H226	:	Flammable liquid and vapour.
H290	:	May be corrosive to metals.
H302	:	Harmful if swallowed.
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.
H331	:	Toxic if inhaled.
H335	:	May cause respiratory irritation.

Full text of other abbreviations

Acute Tox.	:	Acute toxicity
Eye Dam.	:	Serious eye damage
Eye Irrit.	:	Eye irritation
Flam. Liq.	:	Flammable liquids
Met. Corr.	:	Corrosive to metals
Skin Corr.	:	Skin corrosion
Skin Irrit.	:	Skin irritation
Skin Sens.	:	Skin sensitisation
STOT SE	:	Specific target organ toxicity - single exposure
2000/39/EC	:	Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
2006/15/EC	:	Europe. Indicative occupational exposure limit values
ZA OEL	:	South Africa. The Regulations for Hazardous Chemical Agents, Occupational Exposure Limits
2000/39/EC / TWA	:	Limit Value - eight hours
2000/39/EC / STEL	:	Short term exposure limit
2006/15/EC / TWA	:	Limit Value - eight hours
ZA OEL / OEL-RL	:	Occupational Exposure Limit Restricted limit - 8- hour expo-

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sure or equivalent (12 hour shifts)
 ZA OEL / OEL- RL STEL/C : Occupational Exposure Limit Restricted limit - Short term occupational exposure limits / ceiling limits

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIIC - 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; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Further information

Sources of key data used to compile the Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

Classification of the mixture:

Eye Dam. 1	H318
STOT SE 3	H335

Classification procedure:

Calculation method
Calculation method

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only

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to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

ZA / EN