Safety Data Sheet

acc. to MoEL Public Notice 2013-37

ReduHeat

Version number: 1.0 Date of compilation: 10.06.2026

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

1.1 Product identifier

Trade name **ReduHeat**

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

Relevant identified uses
Shading material for horticultural greenhouses
Industrial use

Uses advised against
Do not use for private purposes (household)

1.3 Details of the supplier of the safety data sheet

Lumiforte EMEA B.V.
Geerstraat 8
5111 PS Baarle-Nassau
Netherlands

Telephone: +31 (0)1 35 07 53 99
e-mail: safety@lumiforte.com
Website: www.lumiforte.com

1.4 Emergency telephone number

Emergency information service
+31 (0)1 35 07 53 99
This number is only available during the following office hours: Mon-Fri 09:00 - 17:00, CET: Central European Time

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

2.2 Label elements

Labelling
Not required.

2.3 Other hazards

Results of PBT and vPvB assessment
Does not contain a PBT-/vPvB-substance at a concentration of ≥ 0,1%.

Endocrine disrupting properties
Does not contain an endocrine disruptor (ED) at a concentration of ≥ 0,1%.

SECTION 3: Composition/information on ingredients

3.1 Substances

Not relevant (mixture).

3.2 Mixtures

The product does not contain (other) ingredients which are classified according to present knowledge of the supplier and contribute to the classification of the product and hence require reporting in this section.

Name of substance	Identifier	Wt%	Classification acc. to GHS	Pictograms	Notes	Specific Conc. Limits
3-aminopropyltriethoxysilane	CAS No 919-30-2	0,1 – < 1	Acute Tox. 4 / H302 Skin Corr. 1B / H314 Eye Dam. 1 / H318 Skin Sens. 1B / H317			
reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1)	CAS No 55965-84-9	0,001 – < 0,01	Acute Tox. 3 / H301 Acute Tox. 2 / H310 Acute Tox. 2 / H330 Skin Corr. 1C / H314 Eye Dam. 1 / H318 Skin Sens. 1A / H317 Aquatic Acute 1 / H400 Aquatic Chronic 1 / H410			Skin Corr. 1C; H314: C ≥ 0,6 % Skin Irrit. 2; H315: 0,06 % ≤ C < 0,6 % Eye Dam. 1; H318: C ≥ 0,6 % Eye Irrit. 2; H319: 0,06 % ≤ C < 0,6 % Skin Sens. 1A; H317: C ≥ 0,0015 %

SECTION 4: First aid measures

4.1 Description of first aid measures

General notes

Do not leave affected person unattended. Remove victim out of the danger area. In case of unconsciousness place person in the recovery position. Never give anything by mouth. Take off immediately all contaminated clothing. In all cases of doubt, or when symptoms persist, seek medical advice.

Following inhalation

Provide fresh air. If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions. In case of respiratory tract irritation, consult a physician.

Following skin contact

Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.

Following eye contact

Irrigate copiously with clean, fresh water for at least 15 minutes, holding the eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Following ingestion

Rinse mouth with water (only if the person is conscious). Call a doctor if you feel unwell.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms and effects are not known to date.

4.3 Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water spray; Foam; Dry extinguishing powder; Carbon dioxide (CO2); Sand;
Co-ordinate firefighting measures to the fire surroundings.

Unsuitable extinguishing media

Water jet.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products

During fire hazardous fumes/smoke could be produced. Carbon monoxide (CO). Carbon dioxide (CO2).

5.3 Advice for firefighters

In case of fire and/or explosion do not breathe fumes. Co-ordinate firefighting measures to the fire surroundings. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance.

Special protective equipment for firefighters

Self-contained breathing apparatus (SCBA). Standard protective clothing for firefighters.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Remove persons to safety. Ventilate affected area.

For emergency responders

Wear breathing apparatus if exposed to vapours/dust/spray/gases. Use personal protective equipment as required.

6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains.

Advice on how to clean up a spill

Absorb with liquid-binding material (sand, diatomaceous earth, acid binder, universal binder, sawdust).

Appropriate containment techniques

Use of adsorbent materials.

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Hazardous combustion products: see section 5. Personal protective equipment: see section 8. Incompatible materials: see section 10. Disposal considerations: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Recommendations

- measures to prevent fire as well as aerosol and dust generation

Use local and general ventilation. Use only in well-ventilated areas.

Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Managing of associated risks

- incompatible substances or mixtures

Keep away from alkalis, oxidising substances, acids.

Control of effects

Protect against external exposure, such as

High temperatures. UV-radiation/sunlight. Frost.

Consideration of other advice

Store in a well-ventilated place. Keep container tightly closed.

- packaging compatibilities

Only packagings which are approved (e.g. acc. to the Dangerous Goods Regulations) may be used.

7.3 Specific end use(s)

See section 1.2.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational exposure limit values (Workplace Exposure Limits)

Country	Name of agent	CAS No	Identifier	TWA [ppm]	TWA [mg/m³]	STEL [ppm]	STEL [mg/m³]	Notation	Source
KR	mixture of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one	55965-84-9	OEL		0,1			i	KR-OEL

Notation

i	inhalable fraction
STEL	short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)
TWA	time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified)

Relevant DNELs/DMELs/PNECs and other threshold levels

Relevant DNELs of components of the mixture

Name of substance	CAS No	End-point	Threshold level	Protection goal, route of exposure	Used in	Exposure time
3-aminopropyltriethoxysilane	919-30-2	DNEL	59 mg/m³	human, inhalatory	worker (industry)	acute - systemic effects
3-aminopropyltriethoxysilane	919-30-2	DNEL	8,3 mg/kg bw/day	human, dermal	worker (industry)	acute - systemic effects
3-aminopropyltriethoxysilane	919-30-2	DNEL	17,4 mg/m³	human, inhalatory	consumer (private households)	acute - systemic effects
3-aminopropyltriethoxysilane	919-30-2	DNEL	5 mg/kg bw/day	human, dermal	consumer (private households)	acute - systemic effects
3-aminopropyltriethoxysilane	919-30-2	DNEL	14 mg/m³	human, inhalatory	worker (industry)	chronic - systemic effects
3-aminopropyltriethoxysilane	919-30-2	DNEL	2 mg/kg bw/day	human, dermal	worker (industry)	chronic - systemic effects
3-aminopropyltriethoxysilane	919-30-2	DNEL	3,5 mg/m³	human, inhalatory	consumer (private households)	chronic - systemic effects
3-aminopropyltriethoxysilane	919-30-2	DNEL	1 mg/kg bw/day	human, dermal	consumer (private households)	chronic - systemic effects
3-aminopropyltriethoxysilane	919-30-2	DNEL	1 mg/kg bw/day	human, oral	consumer (private households)	chronic - systemic effects

Relevant PNECs of components						
Name of substance	**CAS No**	**End-point**	**Threshold level**	**Organism**	**Environmental compartment**	**Exposure time**
3-aminopropyltrieth-oxysilane	919-30-2	PNEC	1,3 $^{mg}/_{l}$	aquatic organisms	sewage treatment plant (STP)	short-term (single instance)
3-aminopropyltrieth-oxysilane	919-30-2	PNEC	0,5 $^{mg}/_{l}$	aquatic organisms	freshwater	short-term (single instance)
3-aminopropyltrieth-oxysilane	919-30-2	PNEC	0,05 $^{mg}/_{l}$	aquatic organisms	marine water	short-term (single instance)
3-aminopropyltrieth-oxysilane	919-30-2	PNEC	1,8 $^{mg}/_{kg}$	aquatic organisms	freshwater sediment	short-term (single instance)
3-aminopropyltrieth-oxysilane	919-30-2	PNEC	0,18 $^{mg}/_{kg}$	aquatic organisms	marine sediment	short-term (single instance)
3-aminopropyltrieth-oxysilane	919-30-2	PNEC	0,069 $^{mg}/_{kg}$	terrestrial organ-isms	soil	short-term (single instance)

8.2 Exposure controls

Appropriate engineering controls

General ventilation. Provide eyewash stations and safety showers at the workplace.

Individual protection measures (personal protective equipment)

Eye/face protection



Use safety goggle with side protection

Skin protection



Chemical protective clothing.

Hand protection

Wear suitable gloves. Check leak-tightness/impermeability prior to use. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves. The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

- type of material

Nitrile rubber

- material thickness

Use gloves with a minimum material thickness: ≥ 0,38 mm.

- breakthrough time of the glove material

Use gloves with a minimum breakthrough time of the glove material: >480 minutes (permeation: level 6).

- other protection measures

Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended. Wash hands thoroughly after handling.

Respiratory protection

In case of inadequate ventilation wear respiratory protection.

Environmental exposure controls

Take appropriate precautions to avoid uncontrolled release into the environment. Keep away from drains, surface and ground water.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	liquid
Colour	beige

Particle	not relevant (liquid)

Odour	characteristic

Other safety parameters

pH (value)	9
Melting point/freezing point	not determined
Initial boiling point and boiling range	100 °C calculated value, referring to a component of the mixture
Flash point	not applicable
Evaporation rate	not determined
Flammability (solid, gas)	not relevant, (fluid)
Explosive limits	LEL: UEL: not determined
Vapour pressure	2,3 kPa at 20 °C calculated value, referring to a component of the mixture
Density	1,1 $^{g}/_{cm^3}$
Relative density	information on this property is not available
Solubility	not determined

- n-octanol/water (log KOW)	this information is not available
Auto-ignition temperature	not relevant
Decomposition temperature	no data available

Viscosity

- kinematic viscosity	6.909 $^{mm^2}/_{s}$ at 20 °C
- dynamic viscosity	7.600 mPa s at 20 °C (Brookfield RV, spindle 5, 10 rpm)
Explosive properties	none
Oxidising properties	none

9.2 Other information

There is no additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is not reactive under normal ambient conditions.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

No known hazardous reactions.

10.4 Conditions to avoid

Do not expose to direct sunlight. Extremely high or low temperatures.

10.5 Incompatible materials

Strong acids and bases.

10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known. Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Test data are not available for the complete mixture.

Classification procedure

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

Classification acc. to GHS

Acute toxicity

Shall not be classified as acutely toxic.

Acute toxicity estimate (ATE) of components

Name of substance	CAS No	Exposure route	ATE
3-aminopropyltriethoxysilane	919-30-2	oral	1.490 $^{mg}/_{kg}$
reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1)	55965-84-9	oral	100 $^{mg}/_{kg}$
reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1)	55965-84-9	dermal	50 $^{mg}/_{kg}$
reaction mass of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1)	55965-84-9	inhalation: vapour	0,5 $^{mg}/_{l}$/4h

Acute toxicity of components

Name of substance	CAS No	Exposure route	Endpoint	Value	Species
3-aminopropyltriethoxysilane	919-30-2	oral	LD50	1.490 $^{mg}/_{kg}$	rat
3-aminopropyltriethoxysilane	919-30-2	dermal	LD50	4.075 $^{mg}/_{kg}$	rat

Skin corrosion/irritation
Shall not be classified as corrosive/irritant to skin.

Serious eye damage/eye irritation
Shall not be classified as seriously damaging to the eye or eye irritant.

Respiratory or skin sensitisation
Shall not be classified as a respiratory or skin sensitiser.

Germ cell mutagenicity
Shall not be classified as germ cell mutagenic.

Carcinogenicity
Shall not be classified as carcinogenic.

Reproductive toxicity
Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure
Shall not be classified as a specific target organ toxicant (single exposure).

Specific target organ toxicity - repeated exposure
Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard
Shall not be classified as presenting an aspiration hazard.

11.2 Information on other hazards

Endocrine disrupting properties
Does not contain an endocrine disruptor (ED) at a concentration of ≥ 0,1%.

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute) of components of the mixture

Name of substance	CAS No	Endpoint	Value	Species	Exposure time
3-aminopropyltriethoxysilane	919-30-2	ErC50	>1.000 mg/l	algae	72 h
3-aminopropyltriethoxysilane	919-30-2	LC50	>934 mg/l	zebra fish (Danio rerio)	96 h
3-aminopropyltriethoxysilane	919-30-2	EC50	331 mg/l	daphnia magna	48 h
3-aminopropyltriethoxysilane	919-30-2	NOEC	≥934 mg/l	zebra fish (Danio rerio)	96 h
3-aminopropyltriethoxysilane	919-30-2	growth (EbCx) 10%	321 mg/l	green algae (Desmodesmus subspicatus)	72 h

Aquatic toxicity (chronic) of components of the mixture

Name of substance	CAS No	Endpoint	Value	Species	Exposure time
3-aminopropyltriethoxysilane	919-30-2	EC50	>1.000 mg/l	microorganisms	3 h
3-aminopropyltriethoxysilane	919-30-2	LOEC	>11,9 mg/l	daphnia magna	21 d
3-aminopropyltriethoxysilane	919-30-2	NOEC	≥11,9 mg/l	daphnia magna	21 d
3-aminopropyltriethoxysilane	919-30-2	growth (EbCx) 10%	>1.000 mg/l	microorganisms	3 h

12.2 Persistence and degradability

Data are not available.

12.3 Bioaccumulative potential

Data are not available.

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Does not contain a PBT-/vPvB-substance at a concentration of ≥ 0,1%.

12.6 Endocrine disrupting properties

Does not contain an endocrine disruptor (ED) at a concentration of ≥ 0,1%.

12.7 Other adverse effects

Data are not available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Sewage disposal-relevant information

Do not empty into drains. Avoid release to the environment.

Waste treatment of containers/packagings

Completely emptied packages can be recycled. Handle contaminated packages in the same way as the substance itself.

Remarks

Please consider the relevant national or regional provisions. Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities.

SECTION 14: Transport information

14.1 UN number

Not subject to transport regulations.

14.2 UN proper shipping name

Not relevant.

14.3 Transport hazard class(es)

None.

14.4 Packing group

Not assigned.

14.5 Environmental hazards

Non-environmentally hazardous acc. to the dangerous goods regulations.

14.6 Special precautions for user

There is no additional information.

14.7 Transport in bulk according to IMO instruments

No data available.

Additional information for each of the UN Model Regulations

Transport information - national regulations - additional information (UN RTDG)

Not subject to transport regulations: UN RTDG

International Maritime Dangerous Goods Code (IMDG) - additional information

Not subject to IMDG.

International Civil Aviation Organization (ICAO-IATA/DGR) - additional information

Not subject to ICAO-IATA.

SECTION 15: Regulatory information

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

There is no additional information.

National regulations (Korea, Republic of)

Korea Existing Chemicals Inventory (KECI)

All ingredients are listed or exempt from listing.

15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this mixture by the supplier.

SECTION 16: Other information

Abbreviations and acronyms

Abbr.	Descriptions of used abbreviations
Acute Tox.	Acute toxicity
Aquatic Acute	Hazardous to the aquatic environment - acute hazard
Aquatic Chronic	Hazardous to the aquatic environment - chronic hazard
ATE	Acute Toxicity Estimate
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DGR	Dangerous Goods Regulations (see IATA/DGR)
DMEL	Derived Minimal Effect Level
DNEL	Derived No-Effect Level
EC50	Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval
ED	Endocrine disruptor
ErC50	≡ EC50: in this method, that concentration of test substance which results in a 50 % reduction in either growth (EbC50) or growth rate (ErC50) relative to the control
Eye Dam.	Seriously damaging to the eye
Eye Irrit.	Irritant to the eye
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)

Abbr.	Descriptions of used abbreviations
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
KR-OEL	Ministry of Employment and Labor (industrial accident prevention policy): exposure of chemical and physical factors
LC50	Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval
LD50	Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval
LEL	Lower explosion limit (LEL)
LOEC	Lowest Observed Effect Concentration
NOEC	No Observed Effect Concentration
OEL	Workplace exposure limit
PBT	Persistent, Bioaccumulative and Toxic
PNEC	Predicted No-Effect Concentration
ppm	Parts per million
Skin Corr.	Corrosive to skin
Skin Irrit.	Irritant to skin
Skin Sens.	Skin sensitisation
STEL	Short-term exposure limit
TWA	Time-weighted average
UEL	Upper explosion limit (UEL)
UN RTDG	UN Recommendations on the Transport of Dangerous Good
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

Standard for Classification and Labeling of Chemical Substance and Material Safety Data Sheet (MoEL Public Notice).
UN Recommendations on the Transport of Dangerous Good. International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

Classification procedure

Physical and chemical properties: The classification is based on tested mixture.
Health hazards, Environmental hazards: The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

List of relevant phrases (code and full text as stated in section 2 and 3)

Code	Text
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H310	Fatal in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H330	Fatal if inhaled.

Code	Text
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.