SAFETY DATA SHEET

Fenbendazole Paste Formulation

Version	Revision Date:	SDS Number:	Date of last issue: -
1.0	07.12.2020	7663864-00001	Date of first issue: 07.12.2020

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product name : Fenbendazole Paste Formulation

Manufacturer or supplier's details

Company : Merck & Co., Inc

Address : 126 E. Lincoln Avenue
Rahway, New Jersey U.S.A. 07065

Telephone : +1-908-740-4000

Emergency telephone number : +1-908-423-6000

E-mail address : EHSDATASTEWARD@msd.com

Recommended use of the chemical and restrictions on use

Recommended use : Veterinary product

2. HAZARDS IDENTIFICATION

GHS Classification

Reproductive toxicity : Category 2

Specific target organ toxicity - repeated exposure (Oral) : Category 2 (Liver, Lymph nodes, Stomach, Nervous system)

Short-term (acute) aquatic hazard : Category 1

Long-term (chronic) aquatic hazard : Category 1

GHS-Labelling

Hazard pictograms :

Signal word : Warning

Hazard statements : H361fd Suspected of damaging fertility. Suspected of damaging the unborn child.
H373 May cause damage to organs (Liver, Lymph nodes, Stomach, Nervous system) through prolonged or repeated exposure if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements :

Prevention:

P201 Obtain special instructions before use.
P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P391 Collect spillage.

Storage:

P405 Store locked up.

Other hazards which do not result in classification

None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance/mixture : Mixture

Components

Chemical name	CAS-No.	Classification	MAC value mg/m3 / TSEL value	Concentration (% w/w)
fenbendazole	43210-67-9	Repr.2; H361fd STOT RE2; H373 (Liver, Lymph nodes, Stomach, Nervous system) Aquatic Acute1; H400 Aquatic Chronic1; H410	No data available	>= 10 - < 20
Propylene glycol	57-55-6		MPC-STEL: 7 mg/m3 Class 3 - Moderately dangerous Data Source: RU OEL	>= 10 - < 20
D-Glucitol	50-70-4		MPC-STEL: 10 mg/m3 Class 4 - Low hazard Data Source: RU OEL	>= 1 - < 10
Ethanol#	64-17-5	Flam. Liq.2; H225 Eye Irrit.2A; H319	MPC-TWA: 1.000 mg/m3 Class 4 - Low hazard Data Source: RU OEL	< 0,1

			MPC-STEL: 2.000 mg/m3 Class 4 - Low hazard Data Source: RU OEL	
Diethyl malonate#	105-53-3	Flam. Liq.4; H227 Eye Irrit.2A; H319 Aquatic Acute3; H402	TSEL: 10 mg/m3 Data Source: RU TSEL	>= 0,0025 - < 0,025
2-Furaldehyde#	98-01-1	Flam. Liq.3; H226 Acute Tox.3; H301 Acute Tox.2; H330 Skin Irrit.3; H316 Eye Irrit.2A; H319 Carc.2; H351 STOT SE3; H335 Aquatic Acute3; H402 Aquatic Chronic3; H412	MPC-STEL: 10 mg/m3 Class 3 - Moderately dangerous, substance causing allergic reactions in the working environment, Substances which require special skin and eye protection Data Source: RU OEL	>= 0,0025 - < 0,025
Cinnamaldehyde#	104-55-2	Acute Tox.5; H303 Acute Tox.4; H312 Skin Irrit.2; H315 Eye Irrit.2A; H319 Skin Sens.1; H317 Aquatic Acute2; H401	TSEL: 3 mg/m3 Data Source: RU TSEL	>= 0,0002 - < 0,0025
Isovaleraldehyde#	590-86-3	Flam. Liq.2; H225 Acute Tox.5; H313 Skin Irrit.3; H316 Eye Irrit.2A; H319 Skin Sens.1; H317 STOT SE3;	MPC-STEL: 10 mg/m3 Class 3 - Moderately dangerous Data Source: RU OEL	>= 0,0002 - < 0,0025

		H335 Aquatic Acute2; H401 Aquatic Chronic2; H411		
Acetaldehyde#	75-07-0	Flam. Liq.1; H224 Acute Tox.4; H302 Acute Tox.5; H313 Eye Irrit.2A; H319 Muta.2; H341 Carc.1B; H350 STOT SE3; H335 Aquatic Acute3; H402	MPC-STEL: 5 mg/m3 Class 3 - Moderately dangerous, Substances which require special skin and eye protection Data Source: RU OEL	< 0,0002
Trans-hex-2-en-1-ol#	928-95-0	Flam. Liq.4; H227 Acute Tox.5; H303 Acute Tox.5; H313 Skin Corr.1B; H314 Eye Dam.1; H318	No data available	< 0,1

#: Voluntarily-disclosed non-hazardous substance

For explanation of abbreviations see section 16.

4. 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.

If inhaled : If inhaled, remove to fresh air.
Get medical attention.

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.
Thoroughly clean shoes before reuse.

In case of eye contact : Flush eyes with water as a precaution.
Get medical attention if irritation develops and persists.

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

Most important symptoms and effects, both acute and delayed	:	Suspected of damaging fertility. Suspected of damaging the unborn child. May cause damage to organs through prolonged or repeated exposure if swallowed.
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).
Notes to physician	:	Treat symptomatically and supportively.

5. FIREFIGHTING MEASURES

Flammable properties

Flash point	:	No data available
Ignition temperature	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire-fighting	:	Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).
Environmental precautions	:	Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers).

Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up : Soak up with inert absorbent material.
For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container.
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.

7. HANDLING AND STORAGE

Local/Total ventilation : Use only with adequate ventilation.

Advice on safe handling : Do not breathe mist or vapours.
Do not swallow.
Avoid contact with eyes.
Avoid prolonged or repeated contact with skin.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment
Take care to prevent spills, waste and minimize release to the environment.
See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Conditions for safe storage : Keep in properly labelled containers.
Store locked up.
Store in accordance with the particular national regulations.

Materials to avoid : Do not store with the following product types:
Strong oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Data Source
fenbendazole	43210-67-9	TWA	100 µg/m3 (OEB 2)	Internal
Propylene glycol	57-55-6	MPC-STEL (mixture of vapour and aerosol)	7 mg/m3	RU OEL
	Further information: Class 3 - Moderately dangerous			
D-Glucitol	50-70-4	MPC-STEL (aerosol)	10 mg/m3	RU OEL

	Further information: Class 4 - Low hazard			
Ethanol	64-17-5	MPC-TWA (vapour and/or gas)	1.000 mg/m3	RU OEL
	Further information: Class 4 - Low hazard			
		MPC-STEL (vapour and/or gas)	2.000 mg/m3	RU OEL
	Further information: Class 4 - Low hazard			
Diethyl malonate	105-53-3	TSEL (vapour and/or gas)	10 mg/m3	RU TSEL
2-Furaldehyde	98-01-1	MPC-STEL (vapour and/or gas)	10 mg/m3	RU OEL
	Further information: Class 3 - Moderately dangerous, substance causing allergic reactions in the working environment, Substances which require special skin and eye protection			
Cinnamaldehyde	104-55-2	TSEL (vapour and/or gas)	3 mg/m3	RU TSEL
Isovaleraldehyde	590-86-3	MPC-STEL (vapour and/or gas)	10 mg/m3	RU OEL
	Further information: Class 3 - Moderately dangerous			
Acetaldehyde	75-07-0	MPC-STEL (vapour and/or gas)	5 mg/m3	RU OEL
	Further information: Class 3 - Moderately dangerous, Substances which require special skin and eye protection			

Engineering measures : Use appropriate engineering controls and manufacturing technologies to control airborne concentrations (e.g., dripless quick connections).
All engineering controls should be implemented by facility design and operated in accordance with GMP principles to protect products, workers, and the environment.
Laboratory operations do not require special containment.

Personal protective equipment

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 and organic vapour type

Hand protection

Material : Chemical-resistant gloves

Eye 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.

Skin and body protection : Work uniform or laboratory coat.

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. 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	paste
Colour	:	white to off-white
Odour	:	cinnamon-like
Odour Threshold	:	No data available
pH	:	6 - 8
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	No data available
Flash point	:	No data available
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapour pressure	:	No data available
Relative vapour density	:	No data available
Relative density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	Not applicable

Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Molecular weight	:	No data available
Particle size	:	No data available

10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Can react with strong oxidizing agents.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

Not classified based on available information.

Components:

fenbendazole:

Acute oral toxicity : LD50 (Rat): > 10.000 mg/kg

LD50 (Mouse): > 10.000 mg/kg

Propylene glycol:

Acute oral toxicity : LD50 (Rat): > 5.000 mg/kg

Acute inhalation toxicity : LC50 (Rabbit): > 159 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 (Rabbit): > 2.000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

D-Glucitol:

Acute oral toxicity : LD50 (Rat, female): 15.900 mg/kg

Ethanol:

Acute oral toxicity : LD50 (Rat): > 5.000 mg/kg
Method: OECD Test Guideline 401

Acute inhalation toxicity : LC50 (Rat): 124,7 mg/l
Exposure time: 4 h
Test atmosphere: vapour

Diethyl malonate:

Acute oral toxicity : LD50 (Rat): > 5.000 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg
Method: OECD Test Guideline 402
Remarks: Based on data from similar materials

2-Furaldehyde:

Acute oral toxicity : LD50 (Rat): 108 mg/kg
Method: OECD Test Guideline 401

Acute inhalation toxicity : LC50 (Rat): 1 mg/l
Exposure time: 4 h
Test atmosphere: vapour

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

Cinnamaldehyde:

Acute oral toxicity : LD50 (Rat): 2.200 mg/kg

Acute dermal toxicity : LD50 (Rabbit): 1.260 mg/kg

Isovaleraldehyde:

Acute oral toxicity : LD50 (Rat): 5.740 mg/kg

Acute inhalation toxicity : LC50 (Rat): 42,7 mg/l
Exposure time: 4 h
Test atmosphere: vapour

Acute dermal toxicity : LD50 (Rabbit): 2.534 mg/kg

Acetaldehyde:

Acute oral toxicity : LD50 (Rat): 661 mg/kg

Acute dermal toxicity : LD50 (Rabbit): 3.540 mg/kg

Trans-hex-2-en-1-ol:

Acute oral toxicity	:	LD50 (Rat): 3.500 mg/kg
Acute inhalation toxicity	:	Assessment: Corrosive to the respiratory tract.
Acute dermal toxicity	:	LD50 (Rabbit): 4.500 mg/kg

Skin corrosion/irritation

Not classified based on available information.

Components:

fenbendazole:

Species	:	Rabbit
Result	:	No skin irritation

Propylene glycol:

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

Ethanol:

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

Diethyl malonate:

Species	:	Rabbit
Result	:	No skin irritation

2-Furaldehyde:

Species	:	Rabbit
Method	:	OECD Test Guideline 404
Result	:	Mild skin irritation

Cinnamaldehyde:

Species	:	human skin
Result	:	Skin irritation

Isovaleraldehyde:

Species	:	Rabbit
Method	:	OECD Test Guideline 404
Result	:	Mild skin irritation

Acetaldehyde:

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

Trans-hex-2-en-1-ol:

Species	:	reconstructed human epidermis (RhE)
Method	:	OECD Test Guideline 431
Result	:	Corrosive after 3 minutes to 1 hour of exposure

Serious eye damage/eye irritation

Not classified based on available information.

Components:

fenbendazole:

Species	:	Rabbit
Result	:	No eye irritation

Propylene glycol:

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

D-Glucitol:

Species	:	Rabbit
Result	:	No eye irritation
Remarks	:	Based on data from similar materials

Ethanol:

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

Diethyl malonate:

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

2-Furaldehyde:

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

Cinnamaldehyde:

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

Isovaleraldehyde:

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

Acetaldehyde:

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

Trans-hex-2-en-1-ol:

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

Respiratory or skin sensitisation

Skin sensitisation

Not classified based on available information.

Respiratory sensitisation

Not classified based on available information.

Components:

Propylene glycol:

Test Type : Maximisation Test
Exposure routes : Skin contact
Species : Guinea pig
Result : negative

Ethanol:

Test Type : Local lymph node assay (LLNA)
Exposure routes : Skin contact
Species : Mouse
Result : negative

Diethyl malonate:

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

2-Furaldehyde:

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

Cinnamaldehyde:

Test Type : Local lymph node assay (LLNA)
Exposure routes : Skin contact
Species : Mouse
Result : positive

Assessment : Probability or evidence of low to moderate skin sensitisation rate in humans

Isovaleraldehyde:

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

Assessment : Probability or evidence of low to moderate skin sensitisation rate in humans

Acetaldehyde:

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

Trans-hex-2-en-1-ol:

Test Type : Local lymph node assay (LLNA)
Exposure routes : Skin contact
Species : Mouse
Method : OECD Test Guideline 429
Result : negative
Remarks : Based on data from similar materials

Germ cell mutagenicity

Not classified based on available information.

Components:

fenbendazole:

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

Test Type: DNA Repair
Result: negative

Test Type: Chromosomal aberration
Result: negative

Test Type: in vitro assay
Test system: mouse lymphoma cells
Metabolic activation: Metabolic activation
Result: equivocal

Propylene glycol:

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

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

D-Glucitol:

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

Test Type: Chromosome aberration test in vitro
Result: negative

Ethanol:

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

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

Genotoxicity in vivo : Test Type: Rodent dominant lethal test (germ cell) (in vivo)
Species: Mouse
Application Route: Ingestion
Result: equivocal

Diethyl malonate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: Directive 67/548/EEC, Annex, B.13/14
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative
Remarks: Based on data from similar materials

2-Furaldehyde:

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

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

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

Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)
Result: positive

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

Genotoxicity in vivo : Test Type: Unscheduled DNA synthesis (UDS) test with mammalian liver cells in vivo
Species: Rat
Application Route: Ingestion
Result: negative

Test Type: Transgenic rodent somatic cell gene mutation assay
Species: Mouse
Application Route: Ingestion
Result: negative

Cinnamaldehyde:

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
Remarks: Based on data from similar materials

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

Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Species: Mouse
Application Route: Ingestion
Result: negative

Test Type: Unscheduled DNA synthesis (UDS) test with mammalian liver cells in vivo
Species: Rat
Application Route: Ingestion
Result: negative

Isovaleraldehyde:

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

Result: negative
Remarks: Based on data from similar materials

Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)
Result: positive
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative

Acetaldehyde:

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

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

Test Type: Chromosome aberration test in vitro
Result: positive

Test Type: in vitro micronucleus test
Result: positive

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

Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)
Result: positive

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Rat
Application Route: Intraperitoneal injection
Result: positive

Test Type: Mammalian bone marrow sister chromatid exchange
Species: Mouse
Application Route: Intraperitoneal injection
Result: positive

Germ cell mutagenicity - Assessment : Positive result(s) from in vivo mammalian somatic cell mutagenicity tests.

Trans-hex-2-en-1-ol:

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

Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Carcinogenicity

Not classified based on available information.

Components:

fenbendazole:

Species	:	Mouse
Application Route	:	oral (feed)
Exposure time	:	2 Years
NOAEL	:	405 mg/kg body weight
Result	:	negative

Species	:	Rat
Application Route	:	Oral
Exposure time	:	2 Years
NOAEL	:	5 mg/kg body weight
Result	:	negative
Target Organs	:	Lymph nodes, Liver

Propylene glycol:

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

2-Furaldehyde:

Species	:	Mouse
Application Route	:	Ingestion
Exposure time	:	103 weeks
Method	:	OECD Test Guideline 451
Result	:	positive
Remarks	:	The mechanism or mode of action is not relevant in humans.

Species	:	Hamster
Application Route	:	inhalation (vapour)
Exposure time	:	52 weeks
Result	:	negative

Species	:	Mouse
Application Route	:	Skin contact

Exposure time	:	47 weeks
Result	:	positive
Carcinogenicity - Assessment	:	Limited evidence of carcinogenicity in animal studies

Cinnamaldehyde:

Species	:	Rat
Application Route	:	Ingestion
Exposure time	:	106 weeks
Result	:	negative
Remarks	:	Based on data from similar materials
Species	:	Mouse
Application Route	:	Intraperitoneal injection
Exposure time	:	24 weeks
Result	:	negative

Isovaleraldehyde:

Species	:	Rat
Application Route	:	inhalation (vapour)
Exposure time	:	2 Years
Result	:	negative
Remarks	:	Based on data from similar materials

Acetaldehyde:

Species	:	Rat
Application Route	:	Inhalation
Exposure time	:	121 weeks
Result	:	positive
Carcinogenicity - Assessment	:	Sufficient evidence of carcinogenicity in animal experiments

Reproductive toxicity

Suspected of damaging fertility. Suspected of damaging the unborn child.

Components:

fenbendazole:

Effects on fertility	:	Test Type: Three-generation reproduction toxicity study Species: Rat Application Route: oral (feed) General Toxicity - Parent: NOAEL: 15 mg/kg body weight Fertility: LOAEL: 45 mg/kg body weight Result: Effects on fertility
Effects on foetal development	:	Test Type: Development Species: Dog, female Application Route: Oral Developmental Toxicity: LOAEL: 100 mg/kg body weight Result: Embryotoxic effects and adverse effects on the offspring were detected., No teratogenic effects

Test Type: Embryo-foetal development
Species: Rabbit
Application Route: Oral
Developmental Toxicity: NOAEL: 25 mg/kg body weight
Result: Fetotoxicity

Test Type: Embryo-foetal development
Species: Rabbit
Application Route: Oral
Developmental Toxicity: LOAEL: 63 mg/kg body weight

Test Type: Embryo-foetal development
Species: Rat
Application Route: Oral
Developmental Toxicity: NOAEL: 120 mg/kg body weight
Result: No effects on foetal development

Reproductive toxicity - Assessment : Some evidence of adverse effects on sexual function and fertility, based on animal experiments., Some evidence of adverse effects on development, based on animal experiments.

Propylene glycol:

Effects on fertility : Test Type: Three-generation reproduction toxicity study
Species: Mouse
Application Route: Ingestion
Result: negative

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

D-Glucitol:

Effects on fertility : Test Type: Three-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative

Ethanol:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Mouse
Application Route: Ingestion
Result: negative

Diethyl malonate:

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

Remarks: Based on data from similar materials

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
Remarks: Based on data from similar materials

2-Furaldehyde:

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

Cinnamaldehyde:

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

Acetaldehyde:

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

Trans-hex-2-en-1-ol:

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
Remarks: Based on data from similar materials

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

STOT - single exposure

Not classified based on available information.

Components:

2-Furaldehyde:

Assessment : May cause respiratory irritation.

Isovaleraldehyde:

Assessment : May cause respiratory irritation.

Acetaldehyde:

Assessment : May cause respiratory irritation.

STOT - repeated exposure

May cause damage to organs (Liver, Lymph nodes, Stomach, Nervous system) through prolonged or repeated exposure if swallowed.

Components:

fenbendazole:

Exposure routes : Ingestion
Target Organs : Liver, Lymph nodes, Stomach, Nervous system
Assessment : May cause damage to organs through prolonged or repeated exposure.

2-Furaldehyde:

Assessment : No significant health effects observed in animals at concentrations of 100 mg/kg bw or less.

Repeated dose toxicity

Components:

fenbendazole:

Species : Rat
LOAEL : 500 mg/kg
Application Route : Oral
Exposure time : 2 Weeks
Target Organs : Kidney, Liver

Species : Rat
NOAEL : > 2.500 mg/kg
Application Route : Oral
Exposure time : 30 Days
Remarks : No significant adverse effects were reported

Species : Rat
LOAEL : 1.600 mg/kg
Application Route : Oral
Exposure time : 90 Days
Target Organs : Central nervous system
Symptoms : Tremors

Species : Dog
NOAEL : 4 mg/kg
LOAEL : 8 mg/kg
Exposure time : 6 Months
Target Organs : Stomach, Lymph nodes, Nervous system

Propylene glycol:

Species	:	Rat, male
NOAEL	:	1.700 mg/kg
Application Route	:	Ingestion
Exposure time	:	2 yr

D-Glucitol:

Species	:	Rat
NOAEL	:	>= 7.500 mg/kg
Application Route	:	Ingestion
Exposure time	:	90 Days

Ethanol:

Species	:	Rat
NOAEL	:	1.280 mg/kg
LOAEL	:	3.156 mg/kg
Application Route	:	Ingestion
Exposure time	:	90 Days

2-Furaldehyde:

Species	:	Rat
NOAEL	:	53 mg/kg
Application Route	:	Ingestion
Exposure time	:	13 Weeks

Cinnamaldehyde:

Species	:	Rat
NOAEL	:	200 mg/kg
Application Route	:	Ingestion
Exposure time	:	12 Weeks

Acetaldehyde:

Species	:	Rat
NOAEL	:	125 mg/kg
LOAEL	:	675 mg/kg
Application Route	:	Ingestion
Exposure time	:	28 Days

Species	:	Rat
NOAEL	:	0,3 mg/kg
LOAEL	:	1 mg/kg
Application Route	:	inhalation (vapour)
Exposure time	:	13 Weeks

Trans-hex-2-en-1-ol:

Species	:	Rat
NOAEL	:	> 100 mg/kg
Application Route	:	Ingestion

Exposure time : 98 Days
Remarks : Based on data from similar materials

Aspiration toxicity

Not classified based on available information.

Components:

fenbendazole:

No aspiration toxicity classification

Experience with human exposure

Components:

fenbendazole:

Ingestion : Symptoms: Rapid respiration, Salivation, anorexia, Diarrhoea

12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

fenbendazole:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): > 7,5 mg/l
Exposure time: 96 h
Remarks: No toxicity at the limit of solubility

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 0,008 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

M-Factor (Acute aquatic toxicity) : 100

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0,0015 mg/l
Exposure time: 21 Days
Method: OECD Test Guideline 211

M-Factor (Chronic aquatic toxicity) : 10

Propylene glycol:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 40.613 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Ceriodaphnia dubia (water flea)): 18.340 mg/l
Exposure time: 48 h

Toxicity to algae/aquatic plants : ErC50 (Skeletonema costatum (marine diatom)): 19.300 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to daphnia and other : NOEC (Ceriodaphnia dubia (water flea)): 13.020 mg/l

aquatic invertebrates (Chronic toxicity)		Exposure time: 7 d
Toxicity to microorganisms	:	NOEC (Pseudomonas putida): > 20.000 mg/l Exposure time: 18 h

Ethanol:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): > 1.000 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Ceriodaphnia (water flea)): > 1.000 mg/l Exposure time: 48 h
Toxicity to algae/aquatic plants	:	ErC50 (Chlorella vulgaris (Fresh water algae)): 275 mg/l Exposure time: 72 h
		EC10 (Chlorella vulgaris (Fresh water algae)): 11,5 mg/l Exposure time: 72 h
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 9,6 mg/l Exposure time: 9 d
Toxicity to microorganisms	:	EC50 (Pseudomonas putida): 6.500 mg/l Exposure time: 16 h

Diethyl malonate:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 12 - 17 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 179 mg/l Exposure time: 48 h Method: Directive 67/548/EEC, Annex V, C.2.
Toxicity to algae/aquatic plants	:	ErC50 (Desmodesmus subspicatus (green algae)): > 800 mg/l Exposure time: 72 h
		EC10 (Desmodesmus subspicatus (green algae)): 115 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50 (Pseudomonas putida): 3.097 mg/l Exposure time: 16 h Method: DIN 38 412 Part 8

2-Furaldehyde:

Toxicity to fish	:	EC50 (Leuciscus idus (Golden orfe)): 29 mg/l Exposure time: 48 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 29 mg/l Exposure time: 24 h
Toxicity to algae/aquatic plants	:	NOEC (Microcystis aeruginosa (blue-green algae)): 2,7 mg/l Exposure time: 8 d
Toxicity to fish (Chronic tox-	:	NOEC (Danio rerio (zebra fish)): 0,33 mg/l

icity)		Exposure time: 12 d
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 1,9 mg/l Exposure time: 21 d Method: OECD Test Guideline 211
Toxicity to microorganisms	:	EC50: 760 mg/l Exposure time: 30 min Method: OECD Test Guideline 209

Cinnamaldehyde:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 4,15 mg/l Exposure time: 96 h Method: Directive 67/548/EEC, Annex V, C.1.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3,21 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	:	ErC50 (Chlorella vulgaris (Fresh water algae)): 16,09 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: 71 mg/l Exposure time: 3 h Method: ISO 8192

Isovaleraldehyde:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 3,25 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 177 mg/l Exposure time: 48 h
Toxicity to algae/aquatic plants	:	ErC50 (Desmodesmus subspicatus (green algae)): 137,37 mg/l Exposure time: 96 h EC10 (Desmodesmus subspicatus (green algae)): 101,83 mg/l Exposure time: 96 h
Toxicity to microorganisms	:	EC10 (Pseudomonas putida): 310 mg/l Exposure time: 17 h Method: DIN 38 412 Part 8

Acetaldehyde:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 30,8 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 57,4 mg/l Exposure time: 48 h Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l Exposure time: 72 h Method: OECD Test Guideline 201

Trans-hex-2-en-1-ol:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 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)): 163 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 226 mg/l Exposure time: 72 h Method: OECD Test Guideline 201

Persistence and degradability

Components:

Propylene glycol:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 98,3 % Exposure time: 28 d Method: OECD Test Guideline 301F

D-Glucitol:

Biodegradability	:	Result: Readily biodegradable.

Ethanol:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 84 % Exposure time: 20 d

Diethyl malonate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 99 % Exposure time: 28 d Method: Regulation (EC) No. 440/2008, Annex, C.4-A

2-Furaldehyde:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 93,5 %
Exposure time: 14 d

Cinnamaldehyde:

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

Isovaleraldehyde:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 49,5 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

Acetaldehyde:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 80 %
Exposure time: 14 d
Method: OECD Test Guideline 301C

Trans-hex-2-en-1-ol:

Biodegradability : Result: Readily biodegradable.
Remarks: Based on data from similar materials

Bioaccumulative potential

Components:

fenbendazole:

Bioaccumulation : Species: Lepomis macrochirus (Bluegill sunfish)
Bioconcentration factor (BCF): 240

Partition coefficient: n-octanol/water : log Pow: 2,3

Propylene glycol:

Partition coefficient: n-octanol/water : log Pow: -1,07

D-Glucitol:

Partition coefficient: n-octanol/water : log Pow: -2,20

Ethanol:

Partition coefficient: n-octanol/water : log Pow: -0,35

Diethyl malonate:

Partition coefficient: n-octanol/water : log Pow: 0,96

2-Furaldehyde:

Partition coefficient: n-octanol/water : log Pow: 0,83
Remarks: Calculation

Cinnamaldehyde:

Partition coefficient: n-octanol/water : log Pow: 2,107

Isovaleraldehyde:

Partition coefficient: n-octanol/water : log Pow: 1,5

Acetaldehyde:

Partition coefficient: n-octanol/water : log Pow: 0,45

Trans-hex-2-en-1-ol:

Partition coefficient: n-octanol/water : log Pow: 1,61
Remarks: Calculation

Mobility in soil

Components:

fenbendazole:

Distribution among environmental compartments : log Koc: 4,37

Other adverse effects

No data available

Hygienic standards:

(Allowable concentration in air, water, including fishery waters, soil)

Components	Air	Water	Soil	Data Source
Propylene glycol 57-55-6	TSEL value: 0,03 mg/m3	Maximum Allowable Concentration: 0,6 mg/l Limiting health hazard indicator: general sanitary Hazard class: Class 3 - moderately dangerous Maximum Permissible Concentration 0,5 Milligrams per cubed decimeter Limiting health hazard indicator: toxic Hazard class: 4 Maximum Permissible Concentration		List 2 List 4 List 5

		0,3 Milligrams per cubed decimeter Limiting health hazard indicator: toxic Hazard class: 4		
D-Glucitol 50-70-4	TSEL value: 0,1 mg/m3			List 2
Ethanol 64-17-5	MPC maximum value: 5 mg/m3 Limiting health hazard indicator: reflectory Class 4 - low hazard	Maximum Permissible Concentration 0,01 Milligrams per cubed decimeter Limiting health hazard indicator: sanitary and toxicological effects Hazard class: 3		List 1 List 5
Diethyl malonate 105-53-3	TSEL value: 0,1 mg/m3			List 2
2-Furaldehyde 98-01-1	MPC maximum value: 0,08 mg/m3 Limiting health hazard indicator: Reflectory-resorptive Class 3 - moderately dangerous MPC average value: 0,04 mg/m3 Limiting health hazard indicator: Reflectory-resorptive Class 3 - moderately dangerous	Maximum Permissible Concentration 0,01 Milligrams per cubed decimeter Limiting health hazard indicator: toxic Hazard class: 3 Maximum Allowable Concentration: 1 mg/l Limiting health hazard indicator: organoleptic; causes opalescence Hazard class: Class 4 - low hazard		List 1 List 4 List 5
Cinnamaldehyde 104-55-2	TSEL value: 0,03 mg/m3			List 2
Isovaleraldehyde 590-86-3	TSEL value: 0,03 mg/m3			List 2
Acetaldehyde 75-07-0	MPC maximum value: 0,01 mg/m3 Limiting health hazard indicator: reflectory Class 3 - moderately dangerous	Maximum Allowable Concentration: 0,2 mg/l Limiting health hazard indicator: organoleptic; changes the smell of water Hazard class: Class 4 - low hazard Maximum Permissible Concentration 0,25 Milligrams per cubed decimeter		List 1 List 4 List 5

		Limiting health hazard indicator: organoleptic Hazard class: 4		

List 1: GN 2.1.6.3492-17 Maximum permissible concentrations (MPC) of pollutants in the atmospheric air of urban and rural settlements

List 2: GN 2.1.6.2309-07 Tentative safe exposure level (TSEL) of pollutants in the air of settlements

List 4: GN 2.1.5.1315-03 Maximum Allowable Concentrations (MAC) of Chemical Substances Contained in Water of Water Bodies for Economic-Potable and Social-Domestic Water Use

List 5: Order of the Russian Federal Fisheries Agency "Standards of maximum permissible concentrations of harmful substances in fishery water bodies"

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations.
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

14. TRANSPORT INFORMATION

ADR

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (fenbendazole)
Class	:	9
Packing group	:	III
Labels	:	9
Hazard Identification Number	:	90
Tunnel restriction code	:	(-)
Environmentally hazardous	:	yes

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (fenbendazole)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964
Environmentally hazardous	:	yes

IMDG-Code

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID,

		N.O.S. (fenbendazole)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F
Marine pollutant	:	yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

15. REGULATORY INFORMATION

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

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.

Full text of H-Statements

H224	Extremely flammable liquid and vapour.
H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H227	Combustible liquid.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H303	May be harmful if swallowed.
H312	Harmful in contact with skin.
H313	May be harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H316	Causes mild skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.

H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure if swallowed.
H400	Very toxic to aquatic life.
H401	Toxic to aquatic life.
H402	Harmful 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.

Full text of other abbreviations

Acute Tox.	:	Acute toxicity
Aquatic Acute	:	Short-term (acute) aquatic hazard
Aquatic Chronic	:	Long-term (chronic) aquatic hazard
Carc.	:	Carcinogenicity
Eye Dam.	:	Serious eye damage
Eye Irrit.	:	Eye irritation
Flam. Liq.	:	Flammable liquids
Muta.	:	Germ cell mutagenicity
Repr.	:	Reproductive toxicity
Skin Corr.	:	Skin corrosion
Skin Irrit.	:	Skin irritation
Skin Sens.	:	Skin sensitisation
STOT RE	:	Specific target organ toxicity - repeated exposure
STOT SE	:	Specific target organ toxicity - single exposure
RU OEL	:	Hygienic standard GN 2.2.5.3532-18 "Maximum allowed concentration (MAC) of harmful substances in the air of the working zone"
RU TSEL	:	Russia. GN 2.2.5.2308-07 Tentative safe exposure levels (TSEL) of harmful substances in the working zone air
RU OEL / MPC-STEL	:	Maximum Permissible Concentration - Short Term Exposure
RU OEL / MPC-TWA	:	Maximum Permissible Concentration - Time Weighted Average
RU TSEL / TSEL	:	TSEL value

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); 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; TCSI - Taiwan Chemical Substance 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/

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 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.

RU / EN