

SAFETY DATA SHEET



Avodigen® biofungicide/bionematicide

Version 1.2 Revision Date: 04/05/2023 SDS Number: 50001566 Date of last issue: 03/02/2023
Date of first issue: 02/27/2023

SECTION 1. IDENTIFICATION

Product identifier

Product name Avodigen® biofungicide/bionematicide

Other means of identification

Product code 50001566

Recommended use of the chemical and restrictions on use

Recommended use Biological fungicide/nematicide

Restrictions on use Use as recommended by the label.

Details of the supplier of the safety data sheet

Manufacturer FMC Corporation
2929 WALNUT ST
PHILADELPHIA PA 19104
USA
(215) 299-6000
SDS-Info@fmc.com

Emergency telephone

For leak, fire, spill or accident emergencies, call:
1 800 / 424-9300 (CHEMTREC - U.S.A.)
1 703 / 741-5970 (CHEMTREC - International)
1 703 / 527-3887 (CHEMTREC - Alternate)

Medical emergency:
U.S.A. & Canada: +1 800 / 331-3148
All other countries: +1 651 / 632-6793 (Collect)

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a hazardous substance or mixture.

GHS label elements

Not a hazardous substance or mixture., No labeling elements required.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

Chemical name	CAS-No.	Concentration (% w/w)
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Bacillus subtilis strain FMCH002	Not Assigned	4
Bacillus licheniformis strain FMCH001	Not Assigned	3.5
glycerol	56-81-5	$\geq 30 - < 50$
sodium hydrogensulphate	7681-38-1	$\geq 1 - < 5$
pentasodium triphosphate	7758-29-4	$\geq 1 - < 5$

SECTION 4. FIRST AID MEASURES

- General advice : Do not leave the victim unattended.
- If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.
- In case of skin contact : If on clothes, remove clothes.
If on skin, rinse well with water.
Wash off with soap and plenty of water.
Get medical attention if irritation develops and persists.
- In case of eye contact : Flush eyes with water as a precaution.
Remove contact lenses.
Protect unharmed eye.
If eye irritation persists, consult a specialist.
- If swallowed : Keep respiratory tract clear.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Do not induce vomiting without medical advice.
- Most important symptoms and effects, both acute and delayed : None known.
- Notes to physician : Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media : Dry chemical, CO₂, water spray or regular foam.
- Unsuitable extinguishing media : High volume water jet
- Hazardous combustion products : Thermal decomposition can lead to release of irritating gases and vapors.
Carbon oxides
Ammonia
Sulfur oxides
phosphorus oxides
- Further information : Standard procedure for chemical fires.

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

Special protective equipment for fire-fighters : Firefighters should wear protective clothing and self-contained breathing apparatus.

Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.
If it can be safely done, stop the leak.
Do not touch or walk through the spilled material.
Keep people away from and upwind of spill/leak.
Remove all sources of ignition.
Immediately evacuate personnel to safe areas.
Ensure adequate ventilation.
Never return spills in original containers for re-use.
Mark the contaminated area with signs and prevent access to unauthorized personnel.
Only qualified personnel equipped with suitable protective equipment may intervene.

Environmental precautions : If the product contaminates rivers and lakes or drains inform respective authorities.

Methods and materials for containment and cleaning up : Neutralize with chalk, alkali solution or ammonia.
Wipe up with absorbent material (e.g. cloth, fleece).
Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Advice on safe handling : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.

Conditions for safe storage : Electrical installations / working materials must comply with the technological safety standards.

Further information on storage conditions : The product is stable under normal conditions of warehouse storage.
Protect from heat and direct sunlight.
Store in closed, labelled containers. The storage room should be constructed of incombustible material, closed, dry, ventilated and with impermeable floor, without access of unauthorised persons or children. The room should only be used for storage of chemicals. Food, drink, feed and seed should not be present. A hand wash station should be available.

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Materials to avoid : No materials to be especially mentioned.
Do not store near acids.

Further information on storage stability : No decomposition if stored and applied as directed.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
glycerol	56-81-5	TWA (mist, respirable fraction)	5 mg/m ³	OSHA Z-1
		TWA (mist, total dust)	15 mg/m ³	OSHA Z-1
		TWA (Mist - total dust)	10 mg/m ³	OSHA P0
		TWA (Mist - respirable fraction)	5 mg/m ³	OSHA P0
urea	57-13-6	TWA	10 mg/m ³	US WEEL

Personal protective equipment

Respiratory protection : In the case of dust or aerosol formation use respirator with an approved filter.

Hand protection
Material : Wear chemical resistant gloves, such as barrier laminate, butyl rubber or nitrile rubber.

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Eye wash bottle with pure water
Tightly fitting safety goggles

Skin and body protection : Protective suit
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Protective measures : Plan first aid action before beginning work with this product. Always have on hand a first-aid kit, together with proper instructions.
Wear suitable protective equipment.
When using do not eat, drink or smoke.
In the context of professional plant protection use as recommended, the end user must refer to the label and the instructions for use.

Hygiene measures : Avoid contact with skin, eyes and clothing.

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When using do not eat or drink.
When using do not smoke.
Wash hands before breaks and at the end of workday.
General industrial hygiene practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : No data available

Odor : No data available

pH : 4

Melting point/freezing point : not determined

Boiling point/boiling range : not determined

Flash point : > 302 °F / > 150 °C

Flammability (liquids) : Not expected to be ignitable

Self-ignition : not auto-flammable

Upper explosion limit / Upper flammability limit : not determined

Lower explosion limit / Lower flammability limit : not determined

Vapor pressure : Not available for this mixture.

Relative vapor density : not determined

Relative density : 1.18 (68 °F / 20 °C)

Solubility(ies)
Water solubility : dispersible

Partition coefficient: n-octanol/water : Not available for this mixture.

Decomposition temperature : not determined

Viscosity
Viscosity, kinematic : not determined

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Explosive properties : Not explosive

Oxidizing properties : Non-oxidizing

Particle size : Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity : No decomposition if stored and applied as directed.

Chemical stability : No decomposition if stored and applied as directed.

Possibility of hazardous reactions : Stable under recommended storage conditions.
No hazards to be specially mentioned.

Conditions to avoid : Avoid extreme temperatures.
Avoid formation of aerosol.
Heat, flames and sparks.

Incompatible materials : Avoid strong acids, bases, and oxidizers.

Hazardous decomposition products : Stable under recommended storage conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Not classified based on available information.

Product:

Acute oral toxicity : Acute toxicity estimate: > 5,000 mg/kg
Method: Calculation method
Remarks: Minimal effects that do not meet the threshold for classification.

Acute inhalation toxicity : Acute toxicity estimate: > 5 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: Calculation method
Remarks: Minimal effects that do not meet the threshold for classification.

Acute dermal toxicity : Acute toxicity estimate: > 2,000 mg/kg
Method: Calculation method
Remarks: Minimal effects that do not meet the threshold for classification.

Skin corrosion/irritation

Not classified based on available information.

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Product:

Assessment : No skin irritation
Method : OECD Test Guideline 404
Remarks : Minimal effects that do not meet the threshold for classification.

Serious eye damage/eye irritation

Not classified based on available information.

Product:

Assessment : No eye irritation
Method : OECD Test Guideline 405
Remarks : Minimal effects that do not meet the threshold for classification.

Respiratory or skin sensitization

Skin sensitization

Not classified based on available information.

Respiratory sensitization

Not classified based on available information.

Product:

Remarks : Minimal effects that do not meet the threshold for classification.

Germ cell mutagenicity

Not classified based on available information.

Product:

Germ cell mutagenicity - Assessment : Contains no ingredient listed as a mutagen

Carcinogenicity

Not classified based on available information.

Product:

Carcinogenicity - Assessment : Contains no ingredient listed as a carcinogen

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

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Reproductive toxicity

Not classified based on available information.

Product:

Reproductive toxicity - Assessment : Contains no ingredient listed as toxic to reproduction

STOT-single exposure

Not classified based on available information.

STOT-repeated exposure

Not classified based on available information.

Components:**sodium hydrogensulphate:**

Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

pentasodium triphosphate:

Routes of exposure : Oral
Target Organs : Kidney
Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Repeated dose toxicity**Components:****glycerol:**

Species : Rat
LOAEL : 1 mg/kg
Application Route : Inhalation
Exposure time : 14 d
Dose : 0, 1, 1.93, 3.91 mg/L
Symptoms : respiratory tract irritation, Fatality

Species : Rat
NOAEL : 0.165 mg/l
LOAEL : 0.662 mg/l
Application Route : Inhalation
Exposure time : 13 w
Dose : 0, 0.033, 0.165, 0.662 mg/L
Symptoms : respiratory tract irritation

sodium hydrogensulphate:

Species : Rat, male and female
NOAEL : 1,000 mg/kg
Application Route : Oral

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Exposure time : 7 weeks
Dose : 100, 300, 1000 mg/kg bw/day
Method : OECD Test Guideline 421
Remarks : Based on data from similar materials

Species : Rabbit, male and female
LOAEL : 2 mL/kg/day(16% w/w)
Application Route : Dermal
Exposure time : 91 d
Dose : 2 ml/kg/day-16 % w/w aq.- Sodi
Method : OECD Test Guideline 411
Remarks : Based on data from similar materials

pentasodium triphosphate:

Species : Rat, male
Application Route : Oral
Exposure time : 28 d
Dose : >2%
Target Organs : Kidney

Species : Dog, male and female
NOAEL : 100 mg/kg
Application Route : Oral
Exposure time : 1 - 5 months

Species : Rat, male and female
Application Route : Oral
Exposure time : 2 years
Dose : 0.05%, 0.5% and 5%
Target Organs : Kidney

Aspiration toxicity

Not classified based on available information.

Further information

Product:

Remarks : No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

glycerol:

Toxicity to fish : LC50 (Fish): 885 mg/l
Exposure time: 96 h

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 1,955 mg/l

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aquatic invertebrates Exposure time: 48 h

Toxicity to algae/aquatic plants : EC50 (*Scenedesmus capricornutum* (fresh water algae)): 2,900 mg/l
Exposure time: 192 h

Toxicity to microorganisms : EC10 (*Pseudomonas putida*): 10,000 mg/l
Exposure time: 16 h

sodium hydrogensulphate:

Toxicity to fish : LC50 (*Pimephales promelas* (fathead minnow)): 7,960 mg/l
Exposure time: 96 h
Test Type: static test
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates : LC50 (*Daphnia magna* (Water flea)): 1,766 mg/l
Exposure time: 48 h
Test Type: static test
Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants : EC50 (Marine Diatom): 1,900 mg/l
Exposure time: 120 h
Test Type: static test
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : LOEC (*Ceriodaphnia dubia* (water flea)): 1,329 mg/l
Exposure time: 7 d
Test Type: semi-static test
Remarks: Based on data from similar materials

Toxicity to microorganisms : NOEC (activated sludge): 8 g/l
Exposure time: 37 d
Remarks: Based on data from similar materials

pentasodium triphosphate:

Toxicity to fish : LC50 (*Danio rerio* (zebra fish)): > 1,850 mg/l
Exposure time: 24 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): > 100 mg/l
Exposure time: 48 h
Test Type: static test

Toxicity to algae/aquatic plants : EC50 (*Skeletonema costatum* (marine diatom)): > 900 mg/l
Exposure time: 96 h

EC50 (*Desmodesmus subspicatus* (green algae)): 160 mg/l
Exposure time: 96 h

Toxicity to fish (Chronic toxicity) : LOEC (*Danio rerio* (zebra fish)): 5 mg/l
Exposure time: 4 d
Test Type: static test
Method: OECD Test Guideline 212

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Persistence and degradability**Product:**

Biodegradability : Remarks: The product/substance is expected to be readily biodegradable.

Components:**Bacillus subtilis strain FMCH002:**

Biodegradability : Remarks: Expected to be biodegradable

Bacillus licheniformis strain FMCH001:

Biodegradability : Remarks: Expected to be biodegradable

glycerol:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 94 %
Exposure time: 24 h

Bioaccumulative potential**Product:**

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Components:**Bacillus subtilis strain FMCH002:**

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Bacillus licheniformis strain FMCH001:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

glycerol:

Partition coefficient: n-octanol/water : log Pow: -1.75 (77 °F / 25 °C)
pH: 7.4

sodium hydrogensulphate:

Bioaccumulation : Bioconcentration factor (BCF): 0.5
Method: QSAR
Remarks: Bioaccumulation is unlikely.

Mobility in soil**Product:**

Distribution among environmental compartments : Remarks: The product is not expected to be mobile in soils.

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Components:
Bacillus subtilis strain FMCH002:

Distribution among environmental compartments : Medium: Soil
 Remarks: The product/substance is insoluble in water and will spread on the water surface.

Bacillus licheniformis strain FMCH001:

Distribution among environmental compartments : Medium: Soil
 Remarks: The product/substance is insoluble in water and will spread on the water surface.

Other adverse effects
Product:

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
 Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological information : No data available

Components:
Bacillus subtilis strain FMCH002:

Additional ecological information : The harmful effects of the product in the environment are considered to be limited.

Bacillus licheniformis strain FMCH001:

Additional ecological information : The harmful effects of the product in the environment are considered to be limited.

SECTION 13. DISPOSAL CONSIDERATIONS
Disposal methods

Waste from residues : The product should not be allowed to enter drains, water courses or the soil.
 Do not contaminate ponds, waterways or ditches with chemical or used container.
 Send to a licensed waste management company.

Contaminated packaging : Empty remaining contents.
 Do not re-use empty containers.
 Packaging that is not properly emptied must be disposed of as the unused product.
 Empty containers should be taken to an approved waste handling site for recycling or disposal.

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SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

Not regulated as a dangerous good

IATA-DGR

Not regulated as a dangerous good

IMDG-Code

Not regulated as a dangerous good

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

Not applicable for product as supplied.

Domestic regulation

49 CFR

Not regulated as a dangerous good

Special precautions for user

Remarks : Not classified as dangerous in the meaning of transport regulations.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Serious eye damage or eye irritation

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCM I Intermediate or Final VOC's (40 CFR 60.489):

glycerol	56-81-5	>= 30 - < 50 %
urea	57-13-6	>= 1 - < 5 %

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Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

This product does not contain any priority pollutants related to the U.S. Clean Water Act

US State Regulations**Massachusetts Right To Know**

glycerol	56-81-5
pentasodium triphosphate	7758-29-4

Pennsylvania Right To Know

water	7732-18-5
glycerol	56-81-5
Bacillus subtilis strain FMCH002	Not Assigned
Bacillus licheniformis strain FMCH001	Not Assigned
pentasodium triphosphate	7758-29-4

Maine Chemicals of High Concern

octamethylcyclotetrasiloxane [D4]	556-67-2
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Vermont Chemicals of High Concern

octamethylcyclotetrasiloxane [D4]	556-67-2
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Washington Chemicals of High Concern

Product does not contain any listed chemicals

California List of Hazardous Substances

pentasodium triphosphate	7758-29-4
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California Permissible Exposure Limits for Chemical Contaminants

glycerol	56-81-5
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The ingredients of this product are reported in the following inventories:

TCSI	:	Not in compliance with the inventory
TSCA	:	Product contains substance(s) not listed on TSCA inventory.
AIIC	:	Not in compliance with the inventory
DSL	:	This product contains the following components that are not on the Canadian DSL nor NDSL.
		Bacillus licheniformis strain FMCH001
		Bacillus subtilis strain FMCH002
ENCS	:	Not in compliance with the inventory
ISHL	:	Not in compliance with the inventory
KECI	:	Not in compliance with the inventory

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PICCS : Not in compliance with the inventory
IECSC : Not in compliance with the inventory
NZIoC : Not in compliance with the inventory
TECI : Not in compliance with the inventory

TSCA list

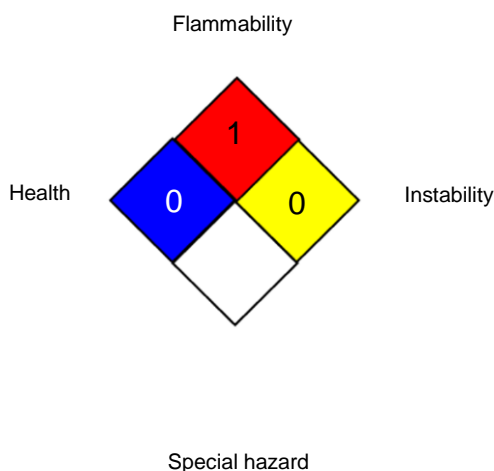
No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



0 No health threat, 1 Slightly Hazardous, 2 Hazardous, 3 Extreme danger, 4 Deadly

HMIS® IV:

HEALTH	/	0
FLAMMABILITY		1
PHYSICAL HAZARD		0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Full text of other abbreviations

OSHA P0 : USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
OSHA Z-1 : USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
US WEEL : USA. Workplace Environmental Exposure Levels (WEEL)
OSHA P0 / TWA : 8-hour time weighted average
OSHA Z-1 / TWA : 8-hour time weighted average
US WEEL / TWA : 8-hr TWA

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of

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the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; 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; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; 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; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; 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; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; 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

Disclaimer

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End of Material Safety Data Sheet