SAFETY DATA SHEET

Abamectin (with Propylene Glycol) Formulation

Version 5.0  Revision Date: 2021/08/27  SDS Number: 4795005-00006  Date of last issue: 2021/04/26  Date of first issue: 2019/08/29

1. PRODUCT AND COMPANY IDENTIFICATION

Chemical product name  :  Abamectin (with Propylene Glycol) Formulation

Supplier’s company name, address and phone number

Company name of supplier  :  MSD
Address  :  Kumagaya, Saitama Prefecture, Xicheng 810 MSD Co., Ltd. Menuma factory
Telephone  :  048-588-8411
E-mail address  :  EHSDATASTEWARD@msd.com
Emergency telephone number  :  +1-908-423-6000

Recommended use of the chemical and restrictions on use
Recommended use  :  Veterinary product

2. HAZARDS IDENTIFICATION

GHS classification of chemical product

Flammable liquids  :  Category 2
Acute toxicity (Inhalation)  :  Category 4
Serious eye damage/eye irritation  :  Category 2A
Specific target organ toxicity - repeated exposure  :  Category 2 (Central nervous system)
Short-term (acute) aquatic hazard  :  Category 1
Long-term (chronic) aquatic hazard  :  Category 1

GHS label elements
Hazard pictograms  :

Signal word  :  Danger
Hazard statements  :  H225 Highly flammable liquid and vapour.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H373 May cause damage to organs (Central nervous system)
through prolonged or repeated exposure.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements:

Prevention:

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P241 Use explosion-proof electrical/ ventilating/ lighting equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static charges.
P260 Do not breathe mist or vapours.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314 Get medical advice/ attention if you feel unwell.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P391 Collect spillage.

Storage:

P403 + P235 Store in a well-ventilated place. Keep cool.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards which do not result in classification:

Important symptoms and outlines of the emergency assumed: Vapours may form explosive mixture with air.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture: Mixture

Components:

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
<th>ENCS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene glycol</td>
<td>57-55-6</td>
<td>&gt;= 40 - &lt; 50</td>
<td>2-234</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Molecular Weight</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>4740-78-7</td>
<td>1,3-Dioxan-5-ol</td>
<td>&gt;= 40 - &lt; 50</td>
</tr>
<tr>
<td>78-93-3</td>
<td>Butanone</td>
<td>&gt;= 10 - &lt; 20</td>
</tr>
<tr>
<td>71751-41-2</td>
<td>abamectin (combination of avermectin B1a and avermectin B1b) (ISO)</td>
<td>2-542</td>
</tr>
</tbody>
</table>

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. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. 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: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention.

If swallowed: If swallowed, DO NOT induce vomiting. If vomiting occurs have person lean forward. Call a physician or poison control centre immediately. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed: Causes serious eye irritation. Harmful if inhaled. May cause damage to organs through prolonged or repeated exposure.

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

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

Unsuitable extinguishing media: High volume water jet

Specific hazards during firefighting: Do not use a solid water stream as it may scatter and spread fire. Flash back possible over considerable distance.
Vapours may form explosive mixtures with air. 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:
- Remove all sources of ignition.
- Ventilate the area.
- 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:
- Non-sparking tools should be used.
- Soak up with inert absorbent material.
- Suppress (knock down) gases/vapours/mists with a water spray jet.
- 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

Handling

Technical measures:
- See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
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Local/Total ventilation : If sufficient ventilation is unavailable, use with local exhaust ventilation. Use explosion-proof electrical, ventilating and lighting equipment.

Advice on safe handling : Do not breathe mist or vapours. Do not swallow. Do not get in eyes. Avoid prolonged or repeated contact with skin. Wash skin thoroughly after handling. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment. Non-sparking tools should be used. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take precautionary measures against static discharges. Do not eat, drink or smoke when using this product. Take care to prevent spills, waste and minimize release to the environment.

Avoidance of contact : Oxidizing agents

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.

Storage


Materials to avoid : Do not store with the following product types: Oxidizing solids Oxidizing liquids

Packaging material : Unsuitable material: None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Threshold limit value and permissible exposure limits for each component in the work environment

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Reference concentration / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
</table>


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<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Target substance</th>
<th>Biological specimen</th>
<th>Sampling time</th>
<th>Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butanone</td>
<td>78-93-3</td>
<td>Methylethylketone</td>
<td>Urine</td>
<td>End of shift or A few hours after high exposure</td>
<td>5 mg/l</td>
<td>JSOH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>abamectin</td>
<td>71751-41-2</td>
<td></td>
<td>Urine</td>
<td>End of shift (As soon as possible after exposure ceases)</td>
<td>2 mg/l</td>
<td>ACGIH BEI</td>
</tr>
</tbody>
</table>

Wipe limit 150 µg/100 cm² Internal

Biological occupational exposure limits

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.
Containment technologies suitable for controlling compounds are required to control at source and to prevent migration of the compound to uncontrolled areas (e.g., open-face containment devices).
Minimize open handling.
Use explosion-proof electrical, ventilating and lighting equipment.

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
Remarks: Consider double gloving. Take note that the product is flammable, which may impact the selection of hand protection.

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. Additional body garments should be used based upon the task being performed (e.g., sleevelets, apron, gauntlets, disposable suits) to avoid exposed skin surfaces. Use appropriate degowning techniques to remove potentially contaminated clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: liquid

Colour: Colourless to pale yellow

Odour: Characteristic

Odour Threshold: No data available

Melting point/freezing point: < -66 °C

Boiling point, initial boiling point and boiling range: 82 °C

Flammability (solid, gas): Not applicable

Flammability (liquids): Not applicable

Lower explosion limit and upper explosion limit / flammability limit

Upper explosion limit / Upper flammability limit: No data available

Lower explosion limit / Lower flammability limit: No data available

Flash point: 16 °C

Decomposition temperature: No data available

pH: No data available

Evaporation rate: No data available

Auto-ignition temperature: No data available

Viscosity: No data available
Viscosity, kinematic : No data available

Solubility(ies)
Water solubility : slightly soluble

Solubility in other solvents : soluble
Solvent: Ethanol

Partition coefficient: n-octanol/water : Not applicable

Vapour pressure : No data available

Density and / or relative density
Relative density : 1.05 - 1.09

Density : No data available

Relative vapour density : No data available

Explosive properties : Not explosive

Oxidizing properties : The substance or mixture is not classified as oxidizing.

Molecular weight : No data available

Particle characteristics
Particle size : Not applicable

10. STABILITY AND REACTIVITY

Reactivity : Not classified as a reactivity hazard.
Chemical stability : Stable under normal conditions.
Possibility of hazardous reactions
Vapours may form explosive mixture with air. Can react with strong oxidizing agents.

Conditions to avoid : Heat, flames and sparks.
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
Harmful if inhaled.
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### Product:

**Acute oral toxicity**  
- Acute toxicity estimate: > 2,000 mg/kg  
  Method: Calculation method

**Acute inhalation toxicity**  
- Acute toxicity estimate: 2.3 mg/l  
  Exposure time: 4 h  
  Test atmosphere: dust/mist  
  Method: Calculation method

**Acute dermal toxicity**  
- Acute toxicity estimate: > 2,000 mg/kg  
  Method: Calculation method

### Components:

#### Propylene glycol:

**Acute oral toxicity**  
- LD50 (Rat): 22,000 mg/kg

**Acute inhalation toxicity**  
- LC50 (Rat): > 44.9 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

#### 1,3-Dioxan-5-ol:

**Acute oral toxicity**  
- LD50 (Rat): > 5,000 mg/kg

**Acute dermal toxicity**  
- LD50 (Rat): > 2,000 mg/kg  
  Remarks: Based on data from similar materials

#### Butanone:

**Acute oral toxicity**  
- LD50 (Rat): > 2,000 - 5,000 mg/kg  
  Remarks: Based on data from similar materials

**Acute inhalation toxicity**  
- LC50 (Rat): > 25.5 mg/l  
  Exposure time: 4 h  
  Test atmosphere: vapour  
  Method: OECD Test Guideline 436  
  Remarks: Based on data from similar materials

**Acute dermal toxicity**  
- LD50 (Rabbit): > 5,000 mg/kg

#### Abamectin (combination of avermectin B1a and avermectin B1b) (ISO):

**Acute oral toxicity**  
- LD50 (Rat): 24 mg/kg  
  LD50 (Mouse): 10 mg/kg  
  LDLo (Monkey): 24 mg/kg  
  Symptoms: Dilatation of the pupil
Acute inhalation toxicity
LC50 (Rat): 0.023 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity
LD50 (Rat): 330 mg/kg
LD50 (Rabbit): 2,000 mg/kg

Skin corrosion/irritation
Not classified based on available information.

Components:

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

1,3-Dioxan-5-ol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Remarks: Based on data from similar materials

Butanone:
Assessment: Repeated exposure may cause skin dryness or cracking.
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Remarks: Based on data from similar materials

abamectin (combination of avermectin B1a and avermectin B1b) (ISO):
Species: Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Causes serious eye irritation.

Components:

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

1,3-Dioxan-5-ol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405
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Remarks: Based on data from similar materials

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

abamectin (combination of avermectin B1a and avermectin B1b) (ISO):
Species: Rabbit
Result: Mild eye irritation

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

1,3-Dioxan-5-ol:
Test Type: Maximisation Test
Exposure routes: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative
Remarks: Based on data from similar materials

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

abamectin (combination of avermectin B1a and avermectin B1b) (ISO):
Test Type: Maximisation Test
Exposure routes: Skin contact
Result: Not a skin sensitizer.

Germ cell mutagenicity
Not classified based on available information.
Components:

**Propylene glycol:**
- Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)  
  Result: negative
- Genotoxicity in vitro: Test Type: Chromosome aberration test in vitro  
  Method: OECD Test Guideline 473  
  Result: negative
- Genotoxicity in vivo: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
  Species: Mouse  
  Application Route: Intraperitoneal injection  
  Result: negative

**1,3-Dioxan-5-ol:**
- Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)  
  Result: negative
- Genotoxicity in vitro: Test Type: In vitro mammalian cell gene mutation test  
  Result: negative
- Genotoxicity in vivo: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
  Species: Mouse  
  Result: negative  
  Remarks: Based on data from similar materials

**Butanone:**
- Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)  
  Result: negative
- Genotoxicity in vitro: Test Type: In vitro mammalian cell gene mutation test  
  Result: negative
- Genotoxicity in vitro: Test Type: Chromosome aberration test in vitro  
  Result: negative
- Genotoxicity in vitro: Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)  
  Result: negative
- Genotoxicity in vivo: Test Type: Saccharomyces cerevisiae, gene mutation assay (in vitro)  
  Result: negative
- Genotoxicity in vivo: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
  Species: Mouse  
  Application Route: Intraperitoneal injection  
  Result: negative
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Genotoxicity in vitro:
- Test Type: Bacterial reverse mutation assay (AMES)
  Result: negative
- Test Type: In vitro mammalian cell gene mutation test
  Test system: Chinese hamster lung cells
  Result: negative
- Test Type: Alkaline elution assay
  Result: negative

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

Carcinogenicity:
Not classified based on available information.

Components:

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

Abamectin (combination of avermectin B1a and avermectin B1b) (ISO):
- Species: Rat
- Application Route: Oral
- Exposure time: 105 weeks
- Result: negative
- Species: Mouse
- Application Route: Oral
- Exposure time: 93 weeks
- Result: negative

Reproductive toxicity:
Not classified based on available information.

Components:

Propylene glycol:
- Effects on fertility: Test Type: Two-generation reproduction toxicity study
  Species: Mouse
  Application Route: Ingestion
  Result: negative
- Effects on foetal development: Test Type: Embryo-foetal development
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**Butanone:**

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

**Effects on foetal development**  :  Test Type: Embryo-foetal development  
Species: Rat  
Application Route: Inhalation  
Method: OECD Test Guideline 414  
Result: negative

**abamectin (combination of avermectin B1a and avermectin B1b) (ISO):**

**Effects on fertility**  :  Test Type: Fertility  
Species: Rat, male  
Application Route: Oral  
Result: Effects on fertility  

Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Oral  
Early Embryonic Development: NOAEL: 0.12 mg/kg body weight  
Result: Fetotoxicity

**Effects on foetal development**  :  Test Type: Embryo-foetal development  
Species: Mouse  
Application Route: Oral  
General Toxicity Maternal: NOAEL: 0.05 mg/kg body weight  
Developmental Toxicity: NOAEL: 0.2 mg/kg body weight  
Result: Cleft palate  
Remarks: Adverse developmental effects were observed

Test Type: Embryo-foetal development  
Species: Rabbit  
Application Route: Oral  
Developmental Toxicity: LOAEL: 2 mg/kg body weight  
Result: Cleft palate, Teratogenic effects, Reduced embryonic survival  
Remarks: Adverse developmental effects were observed

Test Type: Development  
Species: Rat  
Application Route: Oral  
Developmental Toxicity: LOAEL: 1.6 mg/kg body weight  
Result: Teratogenic effects
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.

STOT - single exposure
Not classified based on available information.

Components:

Butanone:
Assessment : May cause drowsiness or dizziness.

STOT - repeated exposure
May cause damage to organs (Central nervous system) through prolonged or repeated exposure.

Components:

abamectin (combination of avermectin B1a and avermectin B1b) (ISO):
Exposure routes : Ingestion
Target Organs : Central nervous system
Assessment : Causes damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

Propylene glycol:
Species : Rat, male
NOAEL : >= 1,700 mg/kg
Application Route : Ingestion
Exposure time : 2 yr

Butanone:
Species : Rat
NOAEL : 14.84 mg/l
Application Route : inhalation (vapour)
Exposure time : 90 Days
Method : OECD Test Guideline 413

abamectin (combination of avermectin B1a and avermectin B1b) (ISO):
Species : Rat
NOAEL : 1.5 mg/kg
Application Route : Oral
Exposure time : 24 Months
Target Organs : Central nervous system
Symptoms : Tremors, ataxia

Species : Mouse
NOAEL : 4.0 mg/kg
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Application Route: Oral  Exposure time: 24 Months  Target Organs: Central nervous system  Symptoms: Tremors, ataxia

Species: Dog  NOAEL: 0.25 mg/kg  LOAEL: 0.5 mg/kg  Application Route: Oral  Exposure time: 53 Weeks  Target Organs: Central nervous system  Symptoms: Tremors, weight loss  Remarks: mortality observed

Species: Monkey  NOAEL: 1.0 mg/kg  Application Route: Oral  Exposure time: 14 Weeks  Target Organs: Central nervous system

Aspiration toxicity
Not classified based on available information.

Components:

Butanone:
The substance or mixture causes concern owing to the assumption that it causes a human aspiration toxicity hazard.

Experience with human exposure

Components:

abamectin (combination of avermectin B1a and avermectin B1b) (ISO):
Ingestion: Symptoms: May cause, Tremors, Diarrhoea, central nervous system effects, Salivation, tearing

12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

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 aquatic invertebrates (Chronic toxicity)**

- NOEC (Ceriodaphnia dubia (water flea)): 13,020 mg/l
- Exposure time: 7 d

**Toxicity to microorganisms**

- NOEC (Pseudomonas putida): > 20,000 mg/l
- Exposure time: 18 h

**1,3-Dioxan-5-ol:**

**Toxicity to fish**

- LL50 (Pimephales promelas (fathead minnow)): > 100 mg/l
- Exposure time: 96 h
- Remarks: Based on data from similar materials

**Toxicity to daphnia and other aquatic invertebrates**

- EL50 (Daphnia magna (Water flea)): > 100 mg/l
- Exposure time: 48 h
- Remarks: Based on data from similar materials

**Toxicity to algae/aquatic plants**

- EL50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l
- Exposure time: 72 h
- Remarks: Based on data from similar materials

- NOELR (Pseudokirchneriella subcapitata (green algae)): > 1 mg/l
- Exposure time: 72 h
- Remarks: Based on data from similar materials

**Toxicity to microorganisms**

- EC10: > 1,000 mg/l
- Exposure time: 3 h
- Method: OECD Test Guideline 209
- Remarks: Based on data from similar materials

**Butanone:**

**Toxicity to fish**

- LC50 (Pimephales promelas (fathead minnow)): 2,993 mg/l
- Exposure time: 96 h
- Method: OECD Test Guideline 203

**Toxicity to daphnia and other aquatic invertebrates**

- EC50 (Daphnia magna (Water flea)): 308 mg/l
- Exposure time: 48 h
- Method: OECD Test Guideline 202

**Toxicity to algae/aquatic plants**

- ErC50 (Pseudokirchneriella subcapitata (green algae)): 2,029 mg/l
- Exposure time: 96 h
- Method: OECD Test Guideline 201

- NOEC (Pseudokirchneriella subcapitata (green algae)): 1,240 mg/l
- Exposure time: 96 h
- Method: OECD Test Guideline 201

**abamectin (combination of avermectin B1a and avermectin B1b) (ISO):**
Toxicity to fish:
- LC50 (Oncorhynchus mykiss (rainbow trout)): 3.2 µg/l
  Exposure time: 96 h
- LC50 (Lepomis macrochirus (Bluegill sunfish)): 9.6 µg/l
  Exposure time: 96 h
- LC50 (Ictalurus punctatus (channel catfish)): 24 µg/l
  Exposure time: 96 h
- LC50 (Cyprinus carpio (Carp)): 42 µg/l
  Exposure time: 96 h
- LC50 (Cyprinodon variegatus (sheepshead minnow)): 15 µg/l
  Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates:
- EC50 (Americamysis): 0.022 µg/l
  Exposure time: 96 h
- EC50 (Daphnia magna (Water flea)): 0.34 µg/l
  Exposure time: 48 h

Toxicity to algae/aquatic plants:
- EC50 (Pseudokirchneriella subcapitata (green algae)): 100 mg/l
  Exposure time: 72 h

M-Factor (Acute aquatic toxicity):
- 10,000

M-Factor (Chronic aquatic toxicity):
- 10,000

Toxicity to microorganisms:
- EC50: > 1,000 mg/l
  Exposure time: 3 h
  Test Type: Respiration inhibition

Persistence and degradability:

Components:

Propylene glycol:
- Biodegradability: Result: Readily biodegradable.
  Biodegradation: 98.3 %
  Exposure time: 28 d
  Method: OECD Test Guideline 301F

1,3-Dioxan-5-ol:
Biodegradability

- Result: Inherently biodegradable.
- Remarks: Based on data from similar materials

**Butanone:**

- Biodegradability: Result: Readily biodegradable.
  - Biodegradation: 98%
  - Exposure time: 28 d
  - Method: OECD Test Guideline 301D

**abamectin (combination of avermectin B1a and avermectin B1b) (ISO):**

- Stability in water: Hydrolysis: 50% (< 12 h)

**Bioaccumulative potential**

**Components:**

**Propylene glycol:**

- Partition coefficient: n-octanol/water: log Pow: -1.07

**1,3-Dioxan-5-ol:**

- Partition coefficient: n-octanol/water: log Pow: -0.65

**Butanone:**

- Partition coefficient: n-octanol/water: log Pow: 0.3

**abamectin (combination of avermectin B1a and avermectin B1b) (ISO):**

- Bioaccumulation: Bioconcentration factor (BCF): 52
- Partition coefficient: n-octanol/water: log Pow: 4

**Mobility in soil**

**Components:**

**abamectin (combination of avermectin B1a and avermectin B1b) (ISO):**

- Distribution among environmental compartments: log Koc: > 3.6

**Hazardous to the ozone layer**

- Not applicable

**Other adverse effects**

- No data available

### 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. Empty containers retain residue and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury and/or death. If not otherwise specified: Dispose of as unused product.

14. TRANSPORT INFORMATION

International Regulations

UNRTDG
UN number: UN 1993
Proper shipping name: FLAMMABLE LIQUID, N.O.S. (Butanone)
Class: 3
Packing group: II
Labels: 3

IATA-DGR
UN/ID No.: UN 1993
Proper shipping name: Flammable liquid, n.o.s. (Butanone)
Class: 3
Packing group: II
Labels: Flammable Liquids
Packing instruction (cargo aircraft): 364
Packing instruction (passenger aircraft): 353

IMDG-Code
UN number: UN 1993
Proper shipping name: FLAMMABLE LIQUID, N.O.S. (Butanone, abamectin (combination of avermectin B1a and avermectin B1b) (ISO))
Class: 3
Packing group: II
Labels: 3
EmS Code: F-E, S-E
Marine pollutant: yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations
Refer to section 15 for specific national regulation.

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.
SAFETY DATA SHEET

Abamectin (with Propylene Glycol) Formulation

15. REGULATORY INFORMATION

Related Regulations

Fire Service Law
Group 4, Type 1 petroleum, Water insoluble liquid, (200 litre), Hazardous rank II

Chemical Substance Control Law
Priority Assessment Chemical Substance

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propane-1,2-diol</td>
<td>106</td>
</tr>
<tr>
<td>Methyl ethyl ketone</td>
<td>115</td>
</tr>
</tbody>
</table>

Industrial Safety and Health Law

Harmful Substances Prohibited from Manufacture
Not applicable

Harmful Substances Required Permission for Manufacture
Not applicable

Substances Prevented From Impairment of Health
Not applicable

Circular concerning Information on Chemicals having Mutagenicity - Annex 2: Information on Existing Chemicals having Mutagenicity
Not applicable

Circular concerning Information on Chemicals having Mutagenicity - Annex 1: Information on Notified Substances having Mutagenicity
Not applicable

Substances Subject to be Notified Names
Article 57-2 (Enforcement Order Table 9)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Number</th>
<th>Concentration (%)</th>
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<tbody>
<tr>
<td>Methyl ethyl ketone</td>
<td>570</td>
<td>&gt;=10 - &lt;=20</td>
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</table>

Substances Subject to be Indicated Names
Article 57 (Enforcement Order Article 18)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl ethyl ketone</td>
<td>570</td>
</tr>
</tbody>
</table>

Ordinance on Prevention of Hazards Due to Specified Chemical Substances
Not applicable

Ordinance on Prevention of Lead Poisoning
Not applicable

Ordinance on Prevention of Tetraalkyl Lead Poisoning
Not applicable

Ordinance on Prevention of Organic Solvent Poisoning
Organic Solvents Class 2
Enforcement Order of the Industrial Safety and Health Law - Attached table 1 (Dangerous Substances)
Inflammable Substance

Poisonous and Deleterious Substances Control Law

<table>
<thead>
<tr>
<th>Deleterious substance</th>
<th>Cabinet Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abamectin and preparations containing it</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof
Not applicable

High Pressure Gas Safety Act
Not applicable

Explosive Control Law
Not applicable

Vessel Safety Law
Flammable liquids (Article 2 and 3 of rules on shipping and storage of dangerous goods and its Attached Table 1)

Aviation Law
Flammable liquid (Article 194 of The Enforcement Rules of Aviation Law and its Attached Table 1)

Marine Pollution and Sea Disaster Prevention etc Law
Bulk transportation : Noxious liquid substance (Category Z)
Pack transportation : Classified as marine pollutant

Narcotics and Psychotropics Control Act
Narcotic or Psychotropic Raw Material (Export / Import Permission)
Not applicable
Specific Narcotic or Psychotropic Raw Material (Export / Import permission)
Not applicable

Waste Disposal and Public Cleansing Law
Specially Controlled Industrial Waste

The components of this product are reported in the following inventories:
AICS : not determined
DSL : not determined
IECSC : not determined

16. OTHER INFORMATION

Further information
Abamectin (with Propylene Glycol) Formula-

SAFETY DATA SHEET

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Full text of other abbreviations

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI : ACGIH - Biological Exposure Indices (BEI)
JP OEL ISHL : Japan. Administrative Control Levels
JSOH : Occupational exposure limits based on biological monitoring (JSOH).

ACGIH / TWA : 8-hour, time-weighted average
ACGIH / STEL : Short-term exposure limit
JP OEL ISHL / ACL : Administrative Control level
JP OEL JSOH / OEL-M : Occupational Exposure Limit-Mean

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; 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; ERG - Emergency Response Guide; 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; Nch - Chilean Norm; NO(A)EC - No Observable Effect Concentration; NO(A)EL - No Observable (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; 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; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TEGI - 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; WHMIS - Workplace Hazardous Materials Information System

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
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