1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Ivermectin / Abamectin Liquid Formulation

Manufacturer or supplier’s details

Company: MSD
Address: Briahnager - Off Pune Nagar Road Wagholi - Pune - India 412 207
Telephone: 908-740-4000
Emergency telephone number: 1-908-423-6000
E-mail address: EHSDATASTEWARD@msd.com
Telefax: 908-735-1496

Recommended use of the chemical and restrictions on use

Recommended use: Veterinary product

2. HAZARDS IDENTIFICATION

Manufacture, Storage and Import of Hazardous Chemicals Rules 1989

Classification
Not classified as hazardous according to criteria laid down in Part I of Schedule-1.

GHS Classification

Acute toxicity (Oral): Category 4
Acute toxicity (Inhalation): Category 4
Serious eye damage/eye irritation: Category 2A
Reproductive toxicity: Category 1B
Specific target organ toxicity - single exposure (Oral): Category 2 (Central nervous system)
Specific target organ toxicity - single exposure: Category 3
Specific target organ toxicity - repeated exposure: Category 2 (Central nervous system)
Short-term (acute) aquatic hazard: Category 1
Long-term (chronic) aquatic: Category 1
hazard

GHS label elements

Signal word: Danger

Hazard pictograms:

Hazard statements:
- H302 + H332 Harmful if swallowed or if inhaled.
- H319 Causes serious eye irritation.
- H335 May cause respiratory irritation.
- H360D May damage the unborn child.
- H371 May cause damage to organs (Central nervous system) if swallowed.
- 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:
- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P260 Do not breathe mist or vapours.
- P264 Wash skin thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P273 Avoid release to the environment.
- P278 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
- P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
- 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.
- P308 + P311 IF exposed or concerned: Call a POISON CENTER/doctor.
- P337 + P313 If eye irritation persists: Get medical advice/ attention.
- P391 Collect spillage.

Storage:
- P405 Store locked up.

Disposal:
- P501 Dispose of contents/ container to an approved waste disposal plant.
SAFETY DATA SHEET

Ivermectin / Abamectin Liquid Formulation

Other hazards which do not result in classification
None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Substance / Mixture</th>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chemical name</td>
</tr>
<tr>
<td></td>
<td>N-Methyl-2-pyrrolidone</td>
</tr>
<tr>
<td></td>
<td>Ivermectin</td>
</tr>
<tr>
<td>Abamectin (combination of avermectin B1a and avermectin B1b)</td>
<td>71751-41-2</td>
</tr>
<tr>
<td></td>
<td>(dl)-a-Tocopheryl acetate</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.
Get medical attention.
Rinse mouth thoroughly with water.
Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed
Harmful if swallowed or if inhaled.
Causes serious eye irritation.
May cause respiratory irritation.
May damage the unborn child.
May cause damage to organs if swallowed.
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: None known.

Specific hazards during firefighting:
Exposure to combustion products may be a hazard to health.

Hazardous combustion products:
Carbon oxides
Nitrogen oxides (NOx)

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 and personal protective equipment recommendations.

Environmental precautions:
Discharge into the environment must be avoided.
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 dyeing 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

Technical measures:
See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

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

Advice on safe handling:
Do not get on skin or clothing.
Do not breathe vapours or spray mist.
Do not swallow.
Do not get in eyes.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment
Keep container tightly closed.
Already sensitised individuals should consult their physician regarding working with respiratory irritants or sensitisers.
Take care to prevent spills, waste and minimize release to the environment.

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

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

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ivermectin</td>
<td>70288-86-7</td>
<td>TWA</td>
<td>0.05 mg/m3 (OEB 3)</td>
<td>Internal</td>
</tr>
<tr>
<td>Abamectin (combination of avermectin B1a and avermectin B1b)</td>
<td>71751-41-2</td>
<td>TWA</td>
<td>30 µg/m3 (OEB 3)</td>
<td>Internal</td>
</tr>
<tr>
<td>(dl)-a-Tocopheryl acetate</td>
<td>7695-91-2</td>
<td>TWA</td>
<td>5000 ug/m3 (OEB 1)</td>
<td>Internal</td>
</tr>
</tbody>
</table>

Biological occupational exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Control parameters</th>
<th>Biological specimen</th>
<th>Sampling time</th>
<th>Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-Methyl-2-pyrrolidone</td>
<td>872-50-4</td>
<td>5-Hydroxy-N-methyl-2-pyrrolidone</td>
<td>Urine</td>
<td>End of shift (As soon as possible after exposure ceases)</td>
<td>100 mg/l</td>
<td>ACGIH BEI</td>
</tr>
</tbody>
</table>

Engineering measures:
- Use appropriate engineering controls and manufacturing technologies to control airborne concentrations (e.g., drip-less 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.

### 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**

**Hand protection**

**Material**: Chemical-resistant gloves

**Remarks**: Consider double gloving.

**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.

**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**: liquid

**Colour**: light yellow

**Odour**: characteristic

**Odour Threshold**: No data available

**pH**: Not applicable

**Melting point/freezing point**: No data available

**Initial boiling point and boiling**: No data available
SAFETY DATA SHEET

Ivermectin / Abamectin Liquid Formulation

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date</th>
<th>SDS Number</th>
<th>Date of last issue</th>
<th>Date of first issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>09/13/2019</td>
<td>1212763-00009</td>
<td>24.04.2019</td>
<td>10.01.2017</td>
</tr>
</tbody>
</table>

- **Flash point**: > 100 °C
- **Evaporation rate**: No data available
- **Flammability (solid, gas)**: Not applicable
- **Flammability (liquids)**: Not applicable
- **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**: 0.91 - 1.00 mg/l
- **Water solubility**: Insoluble
- **Partition coefficient: n-octanol/water**: Not applicable
- **Auto-ignition temperature**: No data available
- **Decomposition temperature**: No data available
- **Viscosity**: Not applicable
- **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**: Not applicable

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**: 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 swallowed or if inhaled.

**Product:**
- **Acute oral toxicity:** Acute toxicity estimate: 981.33 mg/kg
  Method: Calculation method
- **Acute inhalation toxicity:** Acute toxicity estimate: 1.84 mg/l
  Exposure time: 4 h
  Test atmosphere: dust/mist
  Method: Calculation method
- **Acute dermal toxicity:** Acute toxicity estimate: > 5,000 mg/kg
  Method: Calculation method

**Components:**

**N-Methyl-2-pyrrolidone:**
- **Acute oral toxicity:** LD50 (Rat): 4,150 mg/kg
- **Acute inhalation toxicity:** LC50 (Rat): > 5.1 mg/l
  Exposure time: 4 h
  Test atmosphere: dust/mist
  Method: OECD Test Guideline 403
  Assessment: The substance or mixture has no acute inhalation toxicity
- **Acute dermal toxicity:** LD50 (Rat): > 5,000 mg/kg

**Ivermectin:**
- **Acute oral toxicity:** LD50 (Rat): 50 mg/kg
  LD50 (Mouse): 25 mg/kg
  LD50 (Monkey): > 24 mg/kg
  Target Organs: Central nervous system
  Symptoms: Vomiting, Dilatation of the pupil
  Remarks: No mortality observed at this dose.
- **Acute inhalation toxicity:** LC50 (Rat): 5.11 mg/l
  Exposure time: 1 h
  Test atmosphere: dust/mist
- **Acute dermal toxicity:** LD50 (Rabbit): 406 mg/kg
Abamectin (combination of avermectin B1a and avermectin B1b):
- **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

(dl)-a-Tocopheryl acetate:
- **Acute oral toxicity**: LD50 (Rat): > 5,000 mg/kg
- **Acute dermal toxicity**: LD50 (Rat): > 3,000 mg/kg
  - Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation
- Not classified based on available information.

Components:

N-Methyl-2-pyrrolidone:
- **Species**: Rabbit
- **Result**: No skin irritation

Ivermectin:
- **Species**: Rabbit
- **Result**: No skin irritation

Abamectin (combination of avermectin B1a and avermectin B1b):
- **Species**: Rabbit
- **Result**: No skin irritation

(dl)-a-Tocopheryl acetate:
- **Species**: Rabbit
- **Method**: OECD Test Guideline 404
- **Result**: No skin irritation

Serious eye damage/eye irritation
- Causes serious eye irritation.
Components:

N-Methyl-2-pyrrolidone:
- Result: Irritation to eyes, reversing within 21 days
- Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Ivermectin:
- Species: Rabbit
- Result: Mild eye irritation

Abamectin (combination of avermectin B1a and avermectin B1b):
- Species: Rabbit
- Result: Mild eye irritation

(dl)-a-Tocopheryl acetate:
- Species: Rabbit
- Method: OECD Test Guideline 405
- Result: No eye irritation

Respiratory or skin sensitisation

Skin sensitisation
Not classified based on available information.

Respiratory sensitisation
Not classified based on available information.

Components:

N-Methyl-2-pyrrolidone:
- 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

Ivermectin:
- Exposure routes: Dermal
- Species: Humans
- Result: Does not cause skin sensitisation.

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

(dl)-a-Tocopheryl acetate:
- Test Type: Draize Test
- Exposure routes: Skin contact
SAFETY DATA SHEET

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Species: Humans
Result: negative

Germ cell mutagenicity
Not classified based on available information.

Components:

N-Methyl-2-pyrrolidone:

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

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

Ivermectin:

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

Genotoxicity in vitro: Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)
Test system: human diploid fibroblasts
Result: negative

Genotoxicity in vitro: Test Type: Mouse Lymphoma
Result: negative

Abamectin (combination of avermectin B1a and avermectin B1b):

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

Genotoxicity in vitro: Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster lung cells
Result: negative

Genotoxicity in vitro: 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
SAFETY DATA SHEET

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(dl)-a-Tocopheryl acetate:

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

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

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

Carcinogenicity
Not classified based on available information.

Components:

N-Methyl-2-pyrrolidone:
Species: Rat
Application Route: Ingestion
Exposure time: 2 Years
Result: negative

Ivermectin:
Species: Rat
Application Route: Oral
NOAEL: 1.5 mg/kg body weight
Result: negative
Remarks: Based on data from similar materials

Species: Mouse
Application Route: Oral
NOAEL: 2.0 mg/kg body weight
Result: negative
Remarks: Based on data from similar materials

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

Species: Mouse
Application Route: Oral
Exposure time: 93 weeks
Result: negative
Ivermectin / Abamectin Liquid Formulation

Species: Rat
Application Route: Ingestion
Exposure time: 104 weeks
Result: negative

Reproductive toxicity
May damage the unborn child.

Components:

N-Methyl-2-pyrrolidone:

Effects on fertility:
- Test Type: Two-generation reproduction toxicity study
  - Species: Rat
  - Application Route: Ingestion
  - Method: OECD Test Guideline 416
  - Result: negative

Effects on foetal development:
- Test Type: Embryo-foetal development
  - Species: Rat
  - Application Route: Ingestion
  - Method: OECD Test Guideline 414
  - Result: positive

  - Test Type: Fertility/early embryonic development
    - Species: Rat
    - Application Route: inhalation (vapour)
    - Result: positive

  - Test Type: Embryo-foetal development
    - Species: Rabbit
    - Application Route: Ingestion
    - Result: positive

Reproductive toxicity - Assessment:
- Clear evidence of adverse effects on development, based on animal experiments.

Ivermectin:

Effects on fertility:
- Test Type: Fertility
  - Species: Rat
  - Application Route: Oral
  - Fertility: NOAEL: 0.6 mg/kg body weight
  - Result: Animal testing did not show any effects on fertility.

Effects on foetal development:
- Test Type: Development
  - Species: Mouse
  - Application Route: Oral
  - Developmental Toxicity: NOAEL: 0.2 mg/kg body weight
  - Result: Teratogenic effects, Embryotoxic effects and adverse effects on the offspring were detected only at high maternally toxic doses

  - Test Type: Development
    - Species: Rat
Application Route: Oral
Developmental Toxicity: LOAEL: 0.4 mg/kg body weight
Result: Embryotoxic effects and adverse effects on the offspring were detected.
Remarks: The mechanism or mode of action may not be relevant in humans.

Test Type: Development
Species: Rabbit
Application Route: Oral
Result: Teratogenic effects, Embryotoxic effects and adverse effects on the offspring were detected only at high maternally toxic doses

Abamectin (combination of avermectin B1a and avermectin B1b):

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

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.
SAFETY DATA SHEET

Ivermectin / Abamectin Liquid Formulation

Version 5.0  Revision Date: 09/13/2019  SDS Number: 1212763-00009  Date of last issue: 24.04.2019  Date of first issue: 10.01.2017

(dl)-a-Tocopheryl acetate:
Effects on fertility:  Test Type: Reproduction/Developmental toxicity screening test  Species: Rat  Application Route: Ingestion  Result: negative

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

STOT - single exposure
May cause respiratory irritation.  May cause damage to organs (Central nervous system) if swallowed.

Components:

N-Methyl-2-pyrrolidone:
Assessment:  May cause respiratory irritation.  Remarks:  Based on harmonised classification in EU regulation 1272/2008, Annex VI

Ivermectin:
Target Organs:  Central nervous system  Assessment:  Causes damage to organs.

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

Components:

Ivermectin:
Target Organs:  Central nervous system  Assessment:  Causes damage to organs through prolonged or repeated exposure.

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

Repeated dose toxicity

Components:

N-Methyl-2-pyrrolidone:
Species:  Rat, male  NOAEL:  169 mg/kg  LOAEL:  433 mg/kg  Application Route:  Ingestion
### Ivermectin:

- **Species**: Dog
- **NOAEL**: 0.5 mg/kg
- **LOAEL**: 1 mg/kg
- **Application Route**: Oral
- **Exposure time**: 14 Weeks
- **Target Organs**: Central nervous system
- **Symptoms**: Dilatation of the pupil, Tremors, Lack of coordination, anorexia

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

#### Rat
- **NOAEL**: 1.5 mg/kg
- **Application Route**: Oral
- **Exposure time**: 24 Months
- **Target Organs**: Central nervous system
- **Symptoms**: Tremors, ataxia

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

#### 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

#### Monkey
- **NOAEL**: 1.0 mg/kg
- **Application Route**: Oral
- **Exposure time**: 14 Weeks
- **Target Organs**: Central nervous system
(dl)-α-Tocopheryl acetate:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOAEL</td>
<td>500 mg/kg</td>
</tr>
<tr>
<td>Application Route</td>
<td>Ingestion</td>
</tr>
<tr>
<td>Exposure time</td>
<td>90 Days</td>
</tr>
</tbody>
</table>

**Aspiration toxicity**
Not classified based on available information.

**Experience with human exposure**

**Components:**

**Ivermectin:**

- **Skin contact:** Remarks: Can be absorbed through skin.
- **Eye contact:** Remarks: May irritate eyes.
- **Ingestion:** Symptoms: Drowsiness, Dilatation of the pupil, Tremors, Vomiting, anorexia, Lack of coordination

**Abamectin (combination of avermectin B1a and avermectin B1b):**

- **Ingestion:** Symptoms: May cause, Tremors, Diarrhoea, central nervous system effects, Salivation, tearing

12. **ECOLOGICAL INFORMATION**

**Ecotoxicity**

**Components:**

**N-Methyl-2-pyrrolidone:**

- **Toxicity to fish:** LC50 (Oncorhynchus mykiss (rainbow trout)): > 500 mg/l Exposure time: 96 h
- **Toxicity to daphnia and other aquatic invertebrates:** EC50 (Daphnia magna (Water flea)): > 1,000 mg/l Exposure time: 24 h Method: DIN 38412
- **Toxicity to algae/aquatic plants:** ErC50 (Desmodesmus subspicatus (green algae)): 600.5 mg/l Exposure time: 72 h
  - EC10 (Desmodesmus subspicatus (green algae)): 92.6 mg/l Exposure time: 72 h
- **Toxicity to microorganisms:** EC50: > 600 mg/l Exposure time: 30 min Method: ISO 8192
- **Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):** NOEC: 12.5 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Method: OECD Test Guideline 211
## Ivermectin:

<table>
<thead>
<tr>
<th>Toxicity to fish</th>
<th>LC50 (Oncorhynchus mykiss (rainbow trout)): 0.003 mg/l Exposure time: 96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LC50 (Lepomis macrochirus (Bluegill sunfish)): 0.0048 mg/l Exposure time: 96 h</td>
</tr>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td>EC50 (Daphnia magna (Water flea)): 0.000025 mg/l Exposure time: 48 h</td>
</tr>
<tr>
<td>Toxicity to algae/aquatic plants</td>
<td>EC50 (Pseudokirchneriella subcapitata (green algae)): &gt; 9.1 mg/l Exposure time: 72 h Method: OECD Test Guideline 201</td>
</tr>
<tr>
<td></td>
<td>NOEC (Pseudokirchneriella subcapitata (green algae)): 9.1 mg/l Exposure time: 72 h Method: OECD Test Guideline 201</td>
</tr>
<tr>
<td>M-Factor (Acute aquatic toxicity)</td>
<td>10,000</td>
</tr>
<tr>
<td>M-Factor (Chronic aquatic toxicity)</td>
<td>10,000</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Toxicity to fish</th>
<th>LC50 (Oncorhynchus mykiss (rainbow trout)): 3.2 µg/l Exposure time: 96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LC50 (Lepomis macrochirus (Bluegill sunfish)): 9.6 µg/l Exposure time: 96 h</td>
</tr>
<tr>
<td></td>
<td>LC50 (Ictalurus punctatus (channel catfish)): 24 µg/l Exposure time: 96 h</td>
</tr>
<tr>
<td></td>
<td>LC50 (Cyprinus carpio (Carp)): 42 µg/l Exposure time: 96 h</td>
</tr>
<tr>
<td></td>
<td>LC50 (Cyprinodon variegatus (sheepshead minnow)): 15 µg/l Exposure time: 96 h</td>
</tr>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td>EC50 (Americamysis): 0.022 µg/l Exposure time: 96 h</td>
</tr>
<tr>
<td></td>
<td>EC50 (Daphnia magna (Water flea)): 0.34 µg/l Exposure time: 48 h</td>
</tr>
<tr>
<td>Toxicity to algae/aquatic plants</td>
<td>EC50 (Pseudokirchneriella subcapitata (green algae)): 100 mg/l Exposure time: 72 h</td>
</tr>
<tr>
<td>M-Factor (Acute aquatic toxicity)</td>
<td>10,000</td>
</tr>
</tbody>
</table>
Toxicity to microorganisms: EC50: > 1,000 mg/l
Exposure time: 3 h
Test Type: Respiration inhibition

Toxicity to fish (Chronic toxicity): NOEC: 0.52 µg/l
Exposure time: 32 d
Species: Pimephales promelas (fathead minnow)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC: 0.03 µg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
NOEC: 0.0035 µg/l
Exposure time: 28 d
Species: Mysisidopsis bahia (opossum shrimp)

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

(dl)-a-Tocopheryl acetate:
Toxicity to fish: LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

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

NOEC (Pseudokirchneriella subcapitata (green algae)): >= 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms: EC50: > 927 mg/l
Exposure time: 30 min
Method: ISO 8192

Toxicity to fish (Chronic toxicity): NOEC: 100 mg/l
Exposure time: 28 d
Species: Oncorhynchus mykiss (rainbow trout)

Persistence and degradability

Components:

N-Methyl-2-pyrrolidone:
Biodegradability: Result: Readily biodegradable.
Biodegradation: 73 %
Ivermectin / Abamectin Liquid Formulation

Exposure time: 28 d
Method: OECD Test Guideline 301C

Ivermectin:
Biodegradability: Result: Not readily biodegradable.
Biodegradation: 50%
Exposure time: 240 d

Abamectin (combination of avermectin B1a and avermectin B1b):
Stability in water: Hydrolysis: 50% (< 12 h)

(dl)-a-Tocopheryl acetate:
Biodegradability: Result: Not readily biodegradable.
Biodegradation: 21.7 - 31%
Exposure time: 28 d
Method: OECD Test Guideline 301C

Bioaccumulative potential

Components:

N-Methyl-2-pyrrolidone:
Partition coefficient: n-octanol/water: log Pow: -0.46

Ivermectin:
Bioaccumulation: Bioconcentration factor (BCF): 74
Partition coefficient: n-octanol/water: log Pow: 3.22

Abamectin (combination of avermectin B1a and avermectin B1b):
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):
Distribution among environmental compartments: log Koc: > 3.6

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.
If not otherwise specified: Dispose of as unused product.

14. TRANSPORT INFORMATION

International Regulations

**UNRTDG**
- UN number: UN 3082
- Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
  (Abamectin (combination of avermectin B1a and avermectin B1b), Ivermectin)
- Class: 9
- Packing group: III
- Labels: Miscellaneous

**IATA-DGR**
- UN/ID No.: UN 3082
- Proper shipping name: Environmentally hazardous substance, liquid, n.o.s.
  (Abamectin (combination of avermectin B1a and avermectin B1b), Ivermectin)
- 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.
  (Abamectin (combination of avermectin B1a and avermectin B1b), Ivermectin)
- Class: 9
- Packing group: III
- Labels: Miscellaneous
- EmS Code: F-A, S-F
- Marine pollutant: yes

Transport in bulk according to IMO instruments
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.
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

Further information

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

Date format: dd.mm.yyyy

Full text of other abbreviations
ACGIH BEI: ACGIH - Biological Exposure Indices (BEI)

AICS - Australian Inventory of Chemical Substances; 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; IARCC - 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 Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (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 Develop-
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.