1. PRODUCT AND COMPANY IDENTIFICATION

Chemical product name: Permethrin (1%) 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
Serious eye damage/eye irritation: Category 1
Skin sensitisation: Category 1
Germ cell mutagenicity: Category 2
Carcinogenicity: Category 1B
Short-term (acute) aquatic hazard: Category 1
Long-term (chronic) aquatic hazard: Category 1

GHS label elements
Hazard pictograms: 
Signal word: Danger
SAFETY DATA SHEET

Permethrin (1%) Formulation

Precautionary statements:

**Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing mist or vapours.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response:**
P302 + P352 IF ON SKIN: Wash with plenty of water.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
P391 Collect spillage.

**Storage:**
P405 Store locked up.

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

Other hazards which do not result in classification
None known.

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>Sulfuric acid, mono-C16-18-alkyl esters, sodium salts</td>
<td>68955-20-4</td>
<td>15.96</td>
<td>2-1679</td>
</tr>
<tr>
<td>Coconut oil diethanolamide</td>
<td>68603-42-9</td>
<td>&gt;= 3 - &lt; 10</td>
<td></td>
</tr>
<tr>
<td>Ethanol#</td>
<td>64-17-5</td>
<td>&gt;= 1 - &lt; 10</td>
<td>2-202</td>
</tr>
<tr>
<td>Permethrin (ISO)</td>
<td>52645-53-1</td>
<td>1.02</td>
<td>3-4010</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>50-00-0</td>
<td>0.2</td>
<td>2-482</td>
</tr>
</tbody>
</table>

# Voluntarily-disclosed non-hazardous substance

4. FIRST AID MEASURES
General advice: In the case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt seek medical advice.

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

In case of skin contact: In case of contact, immediately flush skin with 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 immediately.

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

Most important symptoms and effects, both acute and delayed: May cause an allergic skin reaction. Causes serious eye damage. Suspected of causing genetic defects. May cause cancer.

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: Chlorine compounds
Carbon oxides
Nitrogen oxides (NOx)
Sulphur oxides
Metal oxides

Specific extinguishing methods: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES
Personal precautions, protective equipment and emergency procedures:
- Use personal protective equipment.
- Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

Environmental precautions:
- Avoid release to the environment.
- Prevent further leakage or spillage if safe to do so.
- Prevent spreading over a wide area (e.g., by containment or oil barriers).
- Retain and dispose of contaminated wash water.
- Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up:
- Soak up with inert absorbent material.
- For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container.
- Clean up remaining materials from spill with suitable absorbent.
- Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
- Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

7. HANDLING AND STORAGE

Handling
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.
- Avoid breathing mist or vapours.
- 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.
- 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.
- Contaminated work clothing should not be allowed out of the workplace.
- 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
SAFETY DATA SHEET
Permethrin (1%) Formulation

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use of administrative controls.

Storage

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

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

- Strong oxidizing agents

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>
<tbody>
<tr>
<td>Ethanol</td>
<td>64-17-5</td>
<td>STEL</td>
<td>1,000 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td>Permethrin (ISO)</td>
<td>52645-53-1</td>
<td>TWA</td>
<td>80 µg/m³ (OEB 3)</td>
<td>Internal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wipe limit</td>
<td>800 µg/100 cm²</td>
<td>Internal</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>50-00-0</td>
<td>ACL</td>
<td>0.1 ppm</td>
<td>JP OEL ISHL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OEL-M</td>
<td>0.1 ppm, 0.12 mg/m³</td>
<td>JP OEL JSOH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Further information: Airway sensitizing agent; Group 2 substances which probably induce allergic reactions in humans. Skin sensitizing agent; Group 1 substances which induce allergic reactions in humans. Group 2A: probably carcinogenic to humans</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OEL-C</td>
<td>0.2 ppm, 0.24 mg/m³</td>
<td>JP OEL JSOH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.1 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>0.3 ppm</td>
<td>ACGIH</td>
</tr>
</tbody>
</table>

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.

Personal protective equipment

Respiratory protection: If adequate local exhaust ventilation is not available or expo-
SAFETY DATA SHEET

Permethrin (1%) Formulation

Filter type: Combined particulates, inorganic gas/vapour and organic vapour type

Hand protection

Material: Chemical-resistant gloves

Remarks: Consider double gloving.

Eye protection

Material: 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

Material: 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: amber

Odour: No data available

Odour Threshold: No data available

Melting point/freezing point: No data available

Boiling point, initial boiling point and boiling range: No data available

Flammability (solid, gas): Not applicable

Flammability (liquids): No data available

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: No data available

Decomposition temperature: No data available

pH: 7.3 - 7.7

Evaporation rate: No data available
SAFETY DATA SHEET

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Auto-ignition temperature: No data available

Viscosity
  Viscosity, kinematic: No data available

Solubility(ies)
  Water solubility: No data available

Partition coefficient: n-octanol/water: Not applicable

Vapour pressure: No data available

Density and / or relative density
  Relative density: No data available
  Density: 1.025 - 1.035 g/cm³
  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: Can react with strong oxidizing agents.
Conditions to avoid: None known.
Incompatible materials: Oxidizing agents
Hazardous decomposition products: No hazardous decomposition products are known.

11. TOXICOLOGICAL INFORMATION

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

Acute toxicity
Not classified based on available information.

Product:
  Acute oral toxicity: Acute toxicity estimate: > 2,000 mg/kg
## Acute inhalation toxicity
- **Permethrin (ISO):**
  - LD50 (Rat): 2.3 mg/l
  - Exposure time: 4 h
  - Test atmosphere: dust/mist

- **Formaldehyde:**
  - Acute toxicity estimate: 100 ppm
  - Exposure time: 4 h
  - Test atmosphere: gas

## Acute dermal toxicity
- **Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:**
  - LD50 (Rat): > 2,000 mg/kg
  - Method: OECD Test Guideline 402
  - Remarks: Based on data from similar materials

## Components:
- **Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:**
  - Acute oral toxicity: LD50 (Rat): 4,010 mg/kg
    - Remarks: Based on data from similar materials

  - Acute dermal toxicity: LD50 (Rat): > 2,000 mg/kg
    - Method: OECD Test Guideline 402
    - Remarks: Based on data from similar materials

- **Coconut oil diethanolamide:**
  - LD50 (Rat): > 5,000 mg/kg
  - LD50 (Rabbit): > 2,000 mg/kg
  - Assessment: The substance or mixture has no acute dermal toxicity

- **Ethanol:**
  - LD50 (Rat): > 5,000 mg/kg
    - Method: OECD Test Guideline 401

## Acute oral toxicity
- **Ethanol:**
  - LD50 (Rat): > 5,000 mg/kg
    - Method: OECD Test Guideline 401

- **Formaldehyde:**
  - Acute toxicity estimate: 100 mg/kg
    - Method: Expert judgement

- **Permethrin (1%) Formulation:**
  - Acute oral toxicity: LD50 (Rat): 4,010 mg/kg
  - Acute dermal toxicity: LD50 (Rat): > 2,000 mg/kg
  - Acute inhalation toxicity: LC50 (Rat): 2.3 mg/l
    - Exposure time: 4 h
    - Test atmosphere: dust/mist
Method: Expert judgement

Acute dermal toxicity : LD50 (Rabbit): 270 mg/kg

Skin corrosion/irritation
Not classified based on available information.

**Components:**

**Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:**
Species : Rabbit
Method : OECD Test Guideline 404
Result : Skin irritation
Remarks : Based on data from similar materials

**Coconut oil diethanolamide:**
Species : Rabbit
Method : OECD Test Guideline 404
Result : Skin irritation
Remarks : Based on data from similar materials

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

**Permethrin (ISO):**
Species : Rabbit
Result : No skin irritation

**Formaldehyde:**
Species : Rabbit
Method : OECD Test Guideline 404
Result : Corrosive after 3 minutes to 1 hour of exposure

Serious eye damage/eye irritation
Causes serious eye damage.

**Components:**

**Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:**
Species : Rabbit
Result : Irreversible effects on the eye
Method : OECD Test Guideline 405
Remarks : Based on data from similar materials

**Coconut oil diethanolamide:**
Species : Rabbit
Result : Irreversible effects on the eye
Method : OECD Test Guideline 405
Remarks : Based on data from similar materials
SAFETY DATA SHEET

Permethrin (1%) Formulation

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

Permethrin (ISO):
Species: Rabbit
Result: No eye irritation

Formaldehyde:
Species: Rabbit
Result: Irreversible effects on the eye

Respiratory or skin sensitisation

Skin sensitisation
May cause an allergic skin reaction.

Respiratory sensitisation
Not classified based on available information.

Components:
Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:
Test Type: Maximisation Test
Exposure routes: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative

Coconut oil diethanolamide:
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

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

Permethrin (ISO):
Test Type: Buehler Test
Exposure routes: Skin contact
Species: Guinea pig
Result: positive
Formaldehyde:
Test Type: Local lymph node assay (LLNA)
Exposure routes: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of high skin sensitisation rate in humans

Germ cell mutagenicity
Suspected of causing genetic defects.

Components:
Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:
Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Coconut oil diethanolamide:
Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Genotoxicity in vivo: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Skin contact
Result: positive
Germ cell mutagenicity - Assessment: Positive result(s) from in vivo mammalian somatic cell mutagenicity tests.

Ethanol:
Genotoxicity in vitro: Test Type: In vitro mammalian cell gene mutation test
Result: negative
Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Genotoxicity in vivo: Test Type: Rodent dominant lethal test (germ cell) (in vivo)
Species: Mouse
Application Route: Ingestion
Result: equivocal

Permethrin (ISO):
Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Test Type: In vitro mammalian cell gene mutation test
### Permethrin (1%) 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>3.1</td>
<td>2021/08/27</td>
<td>5544455-00004</td>
<td>2020/10/10</td>
<td>2020/03/19</td>
</tr>
</tbody>
</table>

#### Result:

- **negative**

#### Test Type: Chromosome aberration test in vitro

Result: negative

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

Result: negative

#### Test Type: Chromosome aberration test in vitro

Result: positive

---

**Genotoxicity in vivo**

- **Test Type:** Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
  - **Species:** Mouse
  - **Result:** negative

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

- **Test Type:** Rodent dominant lethal test (germ cell) (in vivo)
  - **Species:** Mouse
  - **Result:** negative

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

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

---

**Genotoxicity in vitro**

- **Test Type:** Bacterial reverse mutation assay (AMES)
  - **Result:** positive

- **Test Type:** Chromosome aberration test in vitro
  - **Result:** positive

- **Test Type:** Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
  - **Species:** Rat
  - **Application Route:** Inhalation
  - **Result:** positive

---

**Formaldehyde:**

- **Test Type:** Bacterial reverse mutation assay (AMES)
  - **Result:** positive
SAFETY DATA SHEET

Permethrin (1%) Formulation

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

**Carcinogenicity**
May cause cancer.

**Components:**

**Coconut oil diethanolamide:**
- **Species:** Rat
- **Application Route:** Skin contact
- **Exposure time:** 2 years
- **Result:** negative

**Permethrin (ISO):**
- **Species:** Rat
- **Result:** negative

**Formaldehyde:**
- **Species:** Rat
- **Application Route:** Inhalation (gas)
- **Exposure time:** 28 months
- **Result:** positive

**Carcinogenicity - Assessment:** Sufficient evidence of carcinogenicity in animal experiments

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

**Components:**

**Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:**
- **Effects on foetal development**
  - **Test Type:** Embryo-foetal development
  - **Species:** Rat
  - **Application Route:** Ingestion
  - **Result:** negative

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

**Ethanol:**
- **Effects on fertility**
  - **Test Type:** Two-generation reproduction toxicity study
  - **Species:** Mouse
  - **Application Route:** Ingestion
Permethrin (1%) Formulation

Result: negative

**Permethrin (ISO):**

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

Effects on foetal development: Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Result: negative

**Formaldehyde:**

Effects on foetal development: Test Type: Embryo-foetal development
Species: Rat
Application Route: inhalation (gas)
Result: negative

**STOT - single exposure**

Not classified based on available information.

**Components:**

**Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:**

Assessment: May cause respiratory irritation.

**Formaldehyde:**

Assessment: May cause respiratory irritation.

**STOT - repeated exposure**

Not classified based on available information.

**Components:**

**Formaldehyde:**

Exposure routes: inhalation (gas)
Assessment: The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

**Repeated dose toxicity**

**Components:**

**Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:**

Species: Rat
NOAEL: 428 mg/kg
LOAEL: 970 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Coconut oil diethanolamide:
Species: Rat
NOAEL: > 750 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Remarks: Based on data from similar materials

Ethanol:
Species: Rat
NOAEL: 1,280 mg/kg
LOAEL: 3,156 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Permethrin (ISO):
Species: Rat
NOAEL: 0.2201 mg/l
Application Route: Inhalation
Exposure time: 90 Days

Formaldehyde:
Species: Rat
NOAEL: 6 ppm
LOAEL: 10 ppm
Application Route: inhalation (gas)
Exposure time: 28 Days

Aspiration toxicity
Not classified based on available information.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:
Toxicity to fish: LC50 (Danio rerio (zebra fish)): 5.2 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 2.8 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants: ErC50 (Desmodesmus subspicatus (green algae)): 34 mg/l
Exposure time: 72 h
<table>
<thead>
<tr>
<th><strong>Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)</strong></th>
<th>NOEC (Ceriodaphnia dubia (water flea)): 0.204 mg/l Exposure time: 7 d Remarks: Based on data from similar materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Toxicity to microorganisms</strong></td>
<td>NOEC (Pseudomonas putida): 550 mg/l Exposure time: 18 h</td>
</tr>
</tbody>
</table>

**Coconut oil diethanolamide:**
- **Toxicity to fish**
  - LC50 (Brachydanio rerio (zebrafish)): 6.7 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
- **Toxicity to daphnia and other aquatic invertebrates**
  - LC50 (Daphnia magna (Water flea)): 2.15 mg/l Exposure time: 48 h
- **Toxicity to algae/aquatic plants**
  - EC50 (Scenedesmus subspicatus): 2.2 mg/l Exposure time: 72 h NOEC (Scenedesmus subspicatus): 0.32 mg/l Exposure time: 72 h
- **Toxicity to fish (Chronic toxicity)**
  - NOEC (Oncorhynchus mykiss (rainbow trout)): 0.32 mg/l Exposure time: 28 d Method: OECD Test Guideline 204 Remarks: Based on data from similar materials
- **Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)**
  - NOEC (Daphnia magna (Water flea)): 0.07 mg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: Based on data from similar materials

**Ethanol:**
- **Toxicity to fish**
  - LC50 (Pimephales promelas (fathead minnow)): > 1,000 mg/l Exposure time: 96 h
- **Toxicity to daphnia and other aquatic invertebrates**
  - EC50 (Ceriodaphnia (water flea)): > 1,000 mg/l Exposure time: 48 h
- **Toxicity to algae/aquatic plants**
  - ErC50 (Chlorella vulgaris (Fresh water algae)): 275 mg/l Exposure time: 72 h EC10 (Chlorella vulgaris (Fresh water algae)): 11.5 mg/l Exposure time: 72 h
- **Toxicity to microorganisms**
  - NOEC (Daphnia magna (Water flea)): 9.6 mg/l Exposure time: 9 d

**Permethrin (ISO):**
- **Toxicity to fish**
  - LC50 (Lepomis macrochirus (Bluegill sunfish)): 0.00079 mg/l
### Permethrin (1%) Formulation

**Exposure time:** 96 h

<table>
<thead>
<tr>
<th>Category</th>
<th>Endpoint</th>
<th>Value</th>
<th>Method/Exposure Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td>EC50 (Daphnia magna (Water flea))</td>
<td>0.0001 mg/l</td>
<td>Exposure time: 48 h</td>
</tr>
<tr>
<td>Toxicity to algae/aquatic plants</td>
<td>ErC50 (Pseudokirchneriella subcapitata (green algae))</td>
<td>&gt; 1.13 mg/l</td>
<td>Exposure time: 72 h</td>
</tr>
<tr>
<td></td>
<td>EC10 (Pseudokirchneriella subcapitata (green algae))</td>
<td>0.0023 mg/l</td>
<td>Exposure time: 72 h</td>
</tr>
<tr>
<td>M-Factor (Acute aquatic toxicity)</td>
<td></td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>Toxicity to fish (Chronic toxicity)</td>
<td>NOEC (Danio rerio (zebra fish))</td>
<td>0.00041 mg/l</td>
<td>Exposure time: 35 d</td>
</tr>
<tr>
<td></td>
<td>Method: OECD Test Guideline 210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)</td>
<td>NOEC (Daphnia magna (Water flea))</td>
<td>0.0047 µg/l</td>
<td>Exposure time: 21 d</td>
</tr>
<tr>
<td></td>
<td>Method: OECD Test Guideline 211</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-Factor (Chronic aquatic toxicity)</td>
<td></td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>Toxicity to microorganisms</td>
<td>EC50</td>
<td>&gt; 1,000 mg/l</td>
<td>Exposure time: 3 h</td>
</tr>
</tbody>
</table>

**Formaldehyde:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Endpoint</th>
<th>Value</th>
<th>Method/Exposure Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity to fish</td>
<td>LC50</td>
<td>6.7 mg/l</td>
<td>Exposure time: 96 h</td>
</tr>
<tr>
<td></td>
<td>Remarks: Based on data from similar materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td>EC50 (Daphnia pulex (Water flea))</td>
<td>5.8 mg/l</td>
<td>Exposure time: 48 h</td>
</tr>
<tr>
<td></td>
<td>Method: OECD Test Guideline 202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxicity to algae/aquatic plants</td>
<td>EC50 (Desmodesmus subspicatus (green algae))</td>
<td>4.89 mg/l</td>
<td>Exposure time: 72 h</td>
</tr>
<tr>
<td></td>
<td>Method: OECD Test Guideline 201</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxicity to fish (Chronic toxicity)</td>
<td>NOEC (Oryzias latipes (Orange-red killifish))</td>
<td>&gt;= 48 mg/l</td>
<td>Exposure time: 28 d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)</td>
<td>NOEC (Daphnia magna (Water flea))</td>
<td>&gt;= 6.4 mg/l</td>
<td>Exposure time: 21 d</td>
</tr>
<tr>
<td></td>
<td>Method: OECD Test Guideline 211</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxicity to microorganisms</td>
<td>EC50</td>
<td>34.1 mg/l</td>
<td>Exposure time: 120 h</td>
</tr>
</tbody>
</table>
Persistence and degradability

**Components:**

**Sulfuric acid, mono-C16-18-alkyl esters, sodium salts:**
Biodegradability: Readily biodegradable.  
Biodegradation: 77%  
Exposure time: 30 d  
Method: OECD Test Guideline 301D

**Coconut oil diethanolamide:**
Biodegradability: Readily biodegradable.  
Biodegradation: 84%  
Exposure time: 28 d  
Method: OECD Test Guideline 301D

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

**Permethrin (ISO):**
Biodegradability: Not readily biodegradable.  
Method: OECD Test Guideline 301F

**Formaldehyde:**
Biodegradability: Readily biodegradable.  
Biodegradation: 91%  
Exposure time: 14 d  
Method: OECD Test Guideline 301C  
Remarks: Based on data from similar materials

Bioaccumulative potential

**Components:**

**Coconut oil diethanolamide:**
Partition coefficient: n-octanol/water: log Pow: 4.2  
Remarks: Based on data from similar materials

**Ethanol:**
Partition coefficient: n-octanol/water: log Pow: -0.35

**Permethrin (ISO):**
Bioaccumulation: Species: Lepomis macrochirus (Bluegill sunfish)  
Bioconcentration factor (BCF): 570

**Formaldehyde:**
Partition coefficient: n-octanol/water: log Pow: 4.67
SAFETY DATA SHEET

Permethrin (1%) 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>3.1</td>
<td>2021/08/27</td>
<td>5544455-00004</td>
<td>2020/10/10</td>
<td>2020/03/19</td>
</tr>
</tbody>
</table>

Partition coefficient: n-octanol/water
: log Pow: 0.35

Mobility in soil
No data available

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.
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. (Permethrin (ISO))
Class
: 9
Packing group
: III
Labels
: 9

IATA-DGR
UN/ID No.
: UN 3082
Proper shipping name
: Environmentally hazardous substance, liquid, n.o.s. (Permethrin (ISO))
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. (Permethrin (ISO))
Class
: 9
Packing group
: III
Labels
: 9
EmS Code
: F-A, S-F
Marine pollutant
: yes

19 / 23
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.

15. REGULATORY INFORMATION

Related Regulations

Fire Service Law
Not applicable to dangerous materials / designated flammables.

Chemical Substance Control Law
Priority Assessment Chemical Substance

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium alkyl(C=8-18) sulfate</td>
<td>214</td>
</tr>
<tr>
<td>N,N-Bis(2-hydroxyethyl)alkanamide(C=8,10,12,14,16,18, normal chain), (Z)-N,N-bis(2-hydroxyethyl)octadec-9-enamide or (9Z,12Z)-N,N-bis(2-hydroxyethyl)octadeca-9,12-dienamide</td>
<td>173</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>25</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>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>61</td>
<td>&gt;=1 - &lt;10</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>548</td>
<td>&gt;=0.1 - &lt;1</td>
</tr>
</tbody>
</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>
</table>
Ethanol | 61
---|---
Formaldehyde | 548

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
Not applicable

Enforcement Order of the Industrial Safety and Health Law - Attached table 1 (Dangerous Substances)
Not applicable

Poisonous and Deleterious Substances Control Law
Not applicable

Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof

Class I Designated Chemical Substances

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Number</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate</td>
<td>350</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Class II Designated Chemical Substances

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Number</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium alkyl sulfate (alkyl carbon number limited to 16-18 and the mixture.)</td>
<td>7</td>
<td>16</td>
</tr>
</tbody>
</table>

Specified Class I Designated Chemical Substances

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Number</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>411</td>
<td>0.2</td>
</tr>
</tbody>
</table>

High Pressure Gas Safety Act
Not applicable

Explosive Control Law
Not applicable

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

Aviation Law
Miscellaneous dangerous substances and articles (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
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
Sources of key data used to compile the Safety Data Sheet:

Date format: yyyy/mm/dd

Full text of other abbreviations

- ACGIH: USA. ACGIH Threshold Limit Values (TLV)
- JP OEL ISHL: Japan. Administrative Control Levels
- 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
- JP OEL JSOH / OEL-C: Occupational Exposure Limit-Ceiling

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; ICS - 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
SAFETY DATA SHEET

Permethrin (1%) Formulation

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 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; 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; 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 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.

JP / EN