1. PRODUCT AND COMPANY IDENTIFICATION

Chemical product name : Deltamethrin (Scalibor) Collar

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

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity (Oral)</td>
<td>Category 4</td>
</tr>
<tr>
<td>Skin sensitisation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Category 2</td>
</tr>
<tr>
<td>Specific target organ toxicity - repeated exposure (Oral)</td>
<td>Category 2 (Central nervous system, Immune system)</td>
</tr>
<tr>
<td>Specific target organ toxicity - repeated exposure (Inhalation)</td>
<td>Category 2 (Central nervous system)</td>
</tr>
<tr>
<td>Short-term (acute) aquatic hazard</td>
<td>Category 3</td>
</tr>
<tr>
<td>Long-term (chronic) aquatic hazard</td>
<td>Category 3</td>
</tr>
</tbody>
</table>

GHS label elements

Hazard pictograms : 

Signal word : Warning

Hazard statements : H302 Harmful if swallowed. H317 May cause an allergic skin reaction.
H361fd Suspected of damaging fertility. Suspected of damaging the unborn child.
H373 May cause damage to organs (Central nervous system, Immune system) through prolonged or repeated exposure if swallowed.
H373 May cause damage to organs (Central nervous system) through prolonged or repeated exposure if inhaled.
H412 Harmful 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 dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
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:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of water.
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.

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>polyvinyl chloride</td>
<td>9002-86-2</td>
<td>&gt;= 50 - &lt; 60</td>
<td>6-66</td>
</tr>
<tr>
<td>Triphenyl phosphate</td>
<td>115-86-6</td>
<td>40</td>
<td>3-2522, 3-3363</td>
</tr>
<tr>
<td>Deltamethrin (ISO)</td>
<td>52918-63-5</td>
<td>&gt;= 3 - &lt; 10</td>
<td></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. Get medical attention.

In case of skin contact: In case of contact, immediately flush skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

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

If swallowed: If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed: Harmful if swallowed. May cause an allergic skin reaction. Suspected of damaging fertility. Suspected of damaging the unborn child. May cause damage to organs through prolonged or repeated exposure if swallowed. May cause damage to organs through prolonged or repeated exposure if inhaled.

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)
Bromine compounds
Oxides of phosphorus
Metal oxides

Specific extinguishing method: Use extinguishing measures that are appropriate to local cir-
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. 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: Sweep up or vacuum up spillage and collect in suitable container for disposal. 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. Do not swallow. Avoid contact with eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment. Take care to prevent spills, waste and minimize release to the environment.

Avoidance of contact

Hygiene measures: Oxidizing agents

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
Storage

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

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

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 / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>polyvinyl chloride</td>
<td>9002-86-2</td>
<td>TWA (Respirable particulate matter)</td>
<td>1 mg/m3</td>
<td>ACGIH</td>
</tr>
<tr>
<td>Triphenyl phosphate</td>
<td>115-86-6</td>
<td>TWA</td>
<td>3 mg/m3</td>
<td>ACGIH</td>
</tr>
<tr>
<td>Deltamethrin (ISO)</td>
<td>52918-63-5</td>
<td>TWA</td>
<td>15 µg/m3 (OEB 3)</td>
<td>Internal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Further information:</td>
<td>DSEN, Skin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wipe limit</td>
<td></td>
<td></td>
<td>150 µg/100 cm²</td>
<td>Internal</td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>13463-67-7</td>
<td>OEL-M (Respirable dust)</td>
<td>1 mg/m3 (Titanium)</td>
<td>JP OEL JSOH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Further information:</td>
<td>Class 2 Dust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OEL-M (Total dust)</td>
<td></td>
<td></td>
<td>4 mg/m3 (Titanium)</td>
<td>JP OEL JSOH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Further information:</td>
<td>Class 2 Dust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td></td>
<td>10 mg/m3 (Titanium dioxide)</td>
<td>ACGIH</td>
</tr>
</tbody>
</table>

These substance(s) are inextricably bound in the product and therefore do not contribute to a dust inhalation hazard.

Titanium dioxide

Engineering measures: Use feasible engineering controls to minimize exposure to compound. All engineering controls should be implemented by facility design and operated in accordance with GMP principles to protect products, workers, and the environment.

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: Particulates type

Hand protection: Chemical-resistant gloves
Eye protection: Wear safety glasses with side shields or goggles. If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles. Wear a faceshield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.

Skin and body protection: Work uniform or laboratory coat.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>solid</td>
</tr>
<tr>
<td>Colour</td>
<td>white</td>
</tr>
<tr>
<td>Odour</td>
<td>very faint</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point, initial boiling point and boiling range</td>
<td>&gt; 148.8 °C</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not classified as a flammability hazard</td>
</tr>
<tr>
<td>Flammability (liquids)</td>
<td>No data available</td>
</tr>
<tr>
<td>Lower explosion limit and upper explosion limit / flammability limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper explosion limit / Upper flammability limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Lower explosion limit / Lower flammability limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td>No data available</td>
</tr>
<tr>
<td>Water solubility</td>
<td>No data available</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Density and/or relative density
  Relative density: No data available
  Density: No data available
  Relative vapour density: Not applicable
  Explosive properties: Not explosive

Oxidizing properties: The substance or mixture is not classified as oxidizing.
Molecular weight: Not applicable
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
  Skin contact
  Ingestion
  Eye contact

Acute toxicity
Harmful if swallowed.

Product:
  Acute oral toxicity: Acute toxicity estimate: 1,668 mg/kg
  Method: Calculation method
  Acute inhalation toxicity: Acute toxicity estimate: > 5 mg/l
  Exposure time: 4 h
  Test atmosphere: dust/mist
  Method: Calculation method

Components:
  Triphenyl phosphate:
  Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg
  Acute dermal toxicity: LD50 (Rabbit): > 10,000 mg/kg
Deltamethrin (ISO):

<table>
<thead>
<tr>
<th>Route of administration</th>
<th>Species</th>
<th>Method</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>Rat</td>
<td>OECD Test Guideline 404</td>
<td>No skin irritation</td>
</tr>
<tr>
<td></td>
<td>Mouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute inhalation toxicity</td>
<td>Rat</td>
<td>OECD Test Guideline 404</td>
<td>No skin irritation</td>
</tr>
<tr>
<td></td>
<td>Mouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute dermal toxicity</td>
<td>Rabbit</td>
<td>OECD Test Guideline 404</td>
<td>No skin irritation</td>
</tr>
<tr>
<td></td>
<td>Mouse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Titanium dioxide:

<table>
<thead>
<tr>
<th>Route of administration</th>
<th>Species</th>
<th>Method</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>Rat</td>
<td>OECD Test Guideline 404</td>
<td>No skin irritation</td>
</tr>
<tr>
<td></td>
<td>Mouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute inhalation toxicity</td>
<td>Rat</td>
<td>OECD Test Guideline 404</td>
<td>No skin irritation</td>
</tr>
<tr>
<td></td>
<td>Mouse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Skin corrosion/irritation

Not classified based on available information.

Components:

Triphenyl phosphate:

<table>
<thead>
<tr>
<th>Route of administration</th>
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<th>Method</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>Rabbit</td>
<td>OECD Test Guideline 404</td>
<td>No skin irritation</td>
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<tr>
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<td>Mouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute inhalation toxicity</td>
<td>Rabbit</td>
<td>OECD Test Guideline 404</td>
<td>No skin irritation</td>
</tr>
<tr>
<td></td>
<td>Mouse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Deltamethrin (ISO):

<table>
<thead>
<tr>
<th>Route of administration</th>
<th>Species</th>
<th>Method</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
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<td>OECD Test Guideline 404</td>
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<td>Mouse</td>
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<tr>
<td>Acute inhalation toxicity</td>
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<td>OECD Test Guideline 404</td>
<td>No skin irritation</td>
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<td></td>
<td>Mouse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Titanium dioxide:

<table>
<thead>
<tr>
<th>Route of administration</th>
<th>Species</th>
<th>Method</th>
<th>Result</th>
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<tbody>
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<td>Acute oral toxicity</td>
<td>Rabbit</td>
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<td></td>
<td>Mouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute inhalation toxicity</td>
<td>Rabbit</td>
<td>OECD Test Guideline 404</td>
<td>No skin irritation</td>
</tr>
<tr>
<td></td>
<td>Mouse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Serious eye damage/eye irritation

Not classified based on available information.
Components:

**Triphenyl phosphate:**
- Species: Rabbit
- Result: No eye irritation
- Method: OECD Test Guideline 405

**Deltamethrin (ISO):**
- Species: Rabbit
- Result: Moderate eye irritation

**Titanium dioxide:**
- Species: Rabbit
- Result: No eye irritation

**Respiratory or skin sensitisation**

**Skin sensitisation**
May cause an allergic skin reaction.

**Respiratory sensitisation**
Not classified based on available information.

Components:

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

**Deltamethrin (ISO):**
- Test Type: Maximisation Test
- Exposure routes: Dermal
- Species: Guinea pig
- Result: negative

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

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

### Triphenyl phosphate:

**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

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

### Deltamethrin (ISO):

**Genotoxicity in vitro**

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

- Test Type: DNA Repair
  - Test system: Escherichia coli
  - Result: negative

- Test Type: Chromosomal aberration
  - Test system: Chinese hamster ovary cells
  - Result: negative

- Test Type: In vitro mammalian cell gene mutation test
  - Test system: Chinese hamster lung cells
  - Concentration: LOAEL: 20 mg/kg
  - Result: positive

**Genotoxicity in vivo**

- Test Type: Micronucleus test
  - Species: Mouse
  - Application Route: Oral
  - Result: negative

- Test Type: dominant lethal test
  - Species: Mouse
  - Application Route: Oral
  - Result: negative

- Test Type: sister chromatid exchange assay
  - Species: Mouse
  - Cell type: Bone marrow
  - Application Route: Oral
  - Result: negative

### Titanium dioxide:

**Genotoxicity in vitro**

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

**Genotoxicity in vivo**

- Test Type: In vivo micronucleus test
  - Species: Mouse
  - Result: negative
Carcinogenicity
Not classified based on available information.

Components:

Deltamethrin (ISO):
Species : Mouse, male and female
Application Route : oral (feed)
Exposure time : 104 weeks
NOAEL : 8 mg/kg body weight
LOAEL : 4 mg/kg body weight
Result : positive
Target Organs : Lymph nodes

Species : Rat, male and female
Application Route : oral (feed)
Exposure time : 2 Years
Result : negative

Species : Dog, male and female
Application Route : oral (feed)
Exposure time : 2 Years
NOAEL : 1 mg/kg body weight
Result : negative

Titanium dioxide:
Species : Rat
Application Route : inhalation (dust/mist/fume)
Exposure time : 2 Years
Method : OECD Test Guideline 453
Result : positive
Remarks : The mechanism or mode of action may not be relevant in humans.

Carcinogenicity - Assessment : Limited evidence of carcinogenicity in inhalation studies with animals.

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

Components:

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

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rabbit
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative
Deltamethrin (ISO):

Effects on fertility : Test Type: Three-generation reproduction toxicity study
Species: Rat
Application Route: oral (feed)
Early Embryonic Development: NOAEL: 50 mg/kg body weight
Symptoms: No effects on fertility, Embryo-foetal toxicity
Remarks: Significant toxicity observed in testing

Test Type: Two-generation reproduction toxicity study
Species: Rat
Application Route: Oral
Early Embryonic Development: LOAEL: 84 - 149 mg/kg body weight
Symptoms: No effects on fertility, Embryo-foetal toxicity

Test Type: Fertility
Species: Rat, male
Application Route: Oral
Fertility: LOAEL: 1 mg/kg body weight
Symptoms: Effects on fertility
Target Organs: Testes

Effects on foetal development : Test Type: Development
Species: Mouse
Application Route: oral (gavage)
Developmental Toxicity: LOAEL: 1 mg/kg body weight
Result: Skeletal malformations
Remarks: Maternal toxicity observed.

Test Type: Development
Species: Rat, female
Developmental Toxicity: NOAEL: 10 mg/kg body weight
Symptoms: No effects on foetal development

Test Type: Development
Species: Rabbit, female
Application Route: oral (gavage)
Developmental Toxicity: NOAEL: 16 mg/kg body weight
Symptoms: No effects on foetal development

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

STOT - single exposure
Not classified based on available information.

Components:

Deltamethrin (ISO):
Assessment : May cause respiratory irritation.
STOT - repeated exposure
May cause damage to organs (Central nervous system, Immune system) through prolonged or repeated exposure if swallowed.
May cause damage to organs (Central nervous system) through prolonged or repeated exposure if inhaled.

Components:

Deltamethrin (ISO):
- **Exposure routes**: Ingestion
- **Target Organs**: Central nervous system, Immune system
- **Assessment**: Causes damage to organs through prolonged or repeated exposure.

- **Exposure routes**: Inhalation (dust/mist/fume)
- **Target Organs**: Central nervous system
- **Assessment**: Causes damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

Triphenyl phosphate:
- **Species**: Rat
- **NOAEL**: 105 mg/kg
- **Application Route**: Ingestion
- **Exposure time**: 90 Days
- **Method**: OECD Test Guideline 408

Deltamethrin (ISO):
- **Species**: Rat, male and female
- **NOAEL**: 1 mg/kg
- **LOAEL**: 2.5 mg/kg
- **Application Route**: Oral
- **Exposure time**: 13 Weeks
- **Target Organs**: Nervous system
- **Symptoms**: hyperexcitability

- **Species**: Rat
- **LOAEL**: 3 mg/m3
- **Application Route**: Inhalation (dust/mist/fume)
- **Test atmosphere**: Dust/mist
- **Exposure time**: 2 wk / 5 d/wk / 6 h/d
- **Symptoms**: Local irritation, respiratory tract irritation

- **Species**: Dog
- **NOAEL**: 0.1 mg/kg
- **LOAEL**: 1 mg/kg
- **Application Route**: Oral
- **Exposure time**: 13 Weeks
- **Target Organs**: Nervous system
- **Symptoms**: Dilatation of the pupil, Vomiting, Tremors, Diarrhoea, Salivation
<table>
<thead>
<tr>
<th>Species</th>
<th>Rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOAEL</td>
<td>14 mg/kg</td>
</tr>
<tr>
<td>LOAEL</td>
<td>54 mg/kg</td>
</tr>
<tr>
<td>Application Route</td>
<td>Oral</td>
</tr>
<tr>
<td>Exposure time</td>
<td>91 d</td>
</tr>
<tr>
<td>Target Organs</td>
<td>Nervous system</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Mouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOAEL</td>
<td>6 mg/kg</td>
</tr>
<tr>
<td>Application Route</td>
<td>Oral</td>
</tr>
<tr>
<td>Exposure time</td>
<td>12 Weeks</td>
</tr>
<tr>
<td>Target Organs</td>
<td>Immune system</td>
</tr>
<tr>
<td>Symptoms</td>
<td>immune system effects</td>
</tr>
</tbody>
</table>

**Titanium dioxide:**

<table>
<thead>
<tr>
<th>Species</th>
<th>Rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOAEL</td>
<td>24,000 mg/kg</td>
</tr>
<tr>
<td>Application Route</td>
<td>Ingestion</td>
</tr>
<tr>
<td>Exposure time</td>
<td>28 Days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOAEL</td>
<td>10 mg/m3</td>
</tr>
<tr>
<td>Application Route</td>
<td>inhalation (dust/mist/fume)</td>
</tr>
<tr>
<td>Exposure time</td>
<td>2 yr</td>
</tr>
</tbody>
</table>

**Aspiration toxicity**

Not classified based on available information.

**Experience with human exposure**

**Product:**

- **Skin contact**
  - Remarks: Can be absorbed through skin. Based on Animal Evidence May irritate skin.

- **Ingestion**
  - Remarks: May be harmful if swallowed.

**Components:**

**Deltamethrin (ISO):**

- **Inhalation**
  - Symptoms: respiratory tract irritation, Dizziness, Sweating, Headache, Nausea, Vomiting, anorexia, Fatigue, tingling, Palpitation, Blurred vision, muscle twitching

- **Skin contact**
  - Symptoms: Skin irritation, Erythema, pruritis, Headache, Nausea, Vomiting, Dizziness, tingling, Sweating, muscle twitching, Blurred vision, Fatigue, anorexia, Allergic reactions

- **Ingestion**
  - Symptoms: muscle pain, Small pupils
### 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

**Product:**

<table>
<thead>
<tr>
<th>Product</th>
<th>Toxicity to fish</th>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 (Pimephales promelas (fathead minnow))</td>
<td>&gt; 100 mg/l</td>
<td></td>
</tr>
<tr>
<td>Method: OECD Test Guideline 203</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC50 (Daphnia magna (Water flea))</td>
<td>13 mg/l</td>
<td></td>
</tr>
<tr>
<td>Method: OECD Test Guideline 202</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ecotoxicology Assessment**

Chronic aquatic toxicity: Harmful to aquatic life with long lasting effects.

**Components:**

#### Triphenyl phosphate:

<table>
<thead>
<tr>
<th>Product</th>
<th>Toxicity to fish</th>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 (Oncorhynchus mykiss (rainbow trout))</td>
<td>0.4 mg/l</td>
<td></td>
</tr>
<tr>
<td>Exposure time: 96 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC50 (Daphnia magna (Water flea))</td>
<td>2.41 mg/l</td>
<td></td>
</tr>
<tr>
<td>Exposure time: 48 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method: OECD Test Guideline 202</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th>Toxicity to algae/aquatic plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOEC (Pseudokirchneriella subcapitata (green algae))</td>
<td>0.25 mg/l</td>
</tr>
<tr>
<td>Exposure time: 72 h</td>
<td></td>
</tr>
<tr>
<td>Method: OECD Test Guideline 201</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th>Toxicity to fish (Chronic toxicity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC10 (Oncorhynchus mykiss (rainbow trout))</td>
<td>0.037 mg/l</td>
</tr>
<tr>
<td>Exposure time: 30 d</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th>Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOEC (Daphnia magna (Water flea))</td>
<td>0.254 mg/l</td>
</tr>
<tr>
<td>Exposure time: 21 d</td>
<td></td>
</tr>
<tr>
<td>Method: OECD Test Guideline 211</td>
<td></td>
</tr>
</tbody>
</table>

#### Deltamethrin (ISO):

<table>
<thead>
<tr>
<th>Product</th>
<th>Toxicity to fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 (Cyprinodon variegatus (sheepshead minnow))</td>
<td>0.00048 mg/l</td>
</tr>
<tr>
<td>Exposure time: 96 h</td>
<td></td>
</tr>
<tr>
<td>LC50 (Oncorhynchus mykiss (rainbow trout))</td>
<td>0.00039 mg/l</td>
</tr>
<tr>
<td>Exposure time: 96 h</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 (Mysidopsis bahia (opossum shrimp))</td>
<td>0.0037 µg/l</td>
</tr>
<tr>
<td>Exposure time: 48 h</td>
<td></td>
</tr>
<tr>
<td>EC50 (Daphnia magna (Water flea))</td>
<td>0.0035 mg/l</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exposure time: 48 h

LC50 (Gammarus fasciatus (freshwater shrimp)): 0.0003 µg/l
Exposure time: 96 h

Toxicity to algae/aquatic plants:

EC50 (Pseudokirchneriella subcapitata (green algae)): > 9.1 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: No toxicity at the limit of solubility

M-Factor (Acute aquatic toxicity):

: 1,000,000

Toxicity to fish (Chronic toxicity):

NOEC (Pimephales promelas (fathead minnow)): 0.000022 mg/l
Exposure time: 36 d

NOEC (Pimephales promelas (fathead minnow)): 0.000017 mg/l
Exposure time: 260 d

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):

NOEC (Daphnia magna (Water flea)): 0.0041 µg/l
Exposure time: 21 d

M-Factor (Chronic aquatic toxicity):

: 1,000,000

Titanium dioxide:

LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

EC50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 48 h

EC50 (Skeletonema costatum (marine diatom)): > 10,000 mg/l
Exposure time: 72 h

EC50: > 1,000 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

Persistence and degradability

Components:

polyvinyl chloride:

Biodegradability: Result: Not readily biodegradable.

Triphenyl phosphate:

Biodegradability: Result: Readily biodegradable.
Biodegradation: 83 - 94 %
Exposure time: 28 d
Deltamethrin (Scalibor) Collar

Stability in water:
- Hydrolysis: 0 % (30 d)

Bioaccumulative potential

Components:

Triphenyl phosphate:
- Bioaccumulation: Species: Oryzias latipes (Orange-red killifish)
  Bioconcentration factor (BCF): 144
- Partition coefficient: n-octanol/water: log Pow: 4.63

Deltamethrin (ISO):
- Bioaccumulation: Species: Lepomis macrochirus (Bluegill sunfish)
  Bioconcentration factor (BCF): 1,800
- Partition coefficient: n-octanol/water: log Pow: 4.6

Mobility in soil

Components:

Deltamethrin (ISO):
- Distribution among environmental compartments: log Koc: 7.2

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
- Not regulated as a dangerous good

IATA-DGR
- Not regulated as a dangerous good

IMDG-Code
- Not regulated as a dangerous good
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations
Refer to section 15 for specific national regulation.

15. REGULATORY INFORMATION

Related Regulations

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

Chemical Substance Control Law
Not applicable for Specified Chemical Substance, Monitoring Chemical Substance and Priority Assessment Chemical Substance.

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>Triphenyl phosphate</td>
<td>628</td>
<td>&gt;=40 - &lt;50</td>
</tr>
<tr>
<td>Titanium(IV) oxide</td>
<td>191</td>
<td>&gt;=1 - &lt;10</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>
<tbody>
<tr>
<td>Triphenyl phosphate</td>
<td>628</td>
</tr>
<tr>
<td>Titanium(IV) oxide</td>
<td>191</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
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>Triphenyl phosphate</td>
<td>461</td>
<td>40</td>
</tr>
</tbody>
</table>

High Pressure Gas Safety Act
Not applicable

Explosive Control Law
Not applicable

Vessel Safety Law
Not regulated as a dangerous good

Aviation Law
Not regulated as a dangerous good

Marine Pollution and Sea Disaster Prevention etc Law
Bulk transportation : Noxious liquid substance(Category Z)
Pack transportation : Not 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 : Internal technical data, data from raw material SDSs, OECD
SAFETY DATA SHEET

Deltamethrin (Scalibor) Collar

<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>10.0</td>
<td>2020/03/23</td>
<td>85714-00019</td>
<td>2019/09/13</td>
<td>2015/04/01</td>
</tr>
</tbody>
</table>


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

Date format: yyyy/mm/dd

**Full text of other abbreviations**

ACGIH: USA. ACGIH Threshold Limit Values (TLV)


ACGIH / TWA: 8-hour, time-weighted average

JP OEL JSOH / OEL-M: Occupational Exposure Limit-Mean

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; 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 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 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; 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 use.
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