SAFETY DATA SHEET

Fluralaner / Moxidectin Liquid Formulation

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Fluralaner / Moxidectin Liquid Formulation

Manufacturer or supplier’s details
Company : MSD
Address : Rua Coronel Bento Soares, 530
          Cruzeiro - Sao Paulo - Brazil  CEP 12730-340
Telephone : 908-740-4000
Emergency telephone : 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

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with ABNT NBR 14725 Standard

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquids</td>
<td>Category 2</td>
</tr>
<tr>
<td>Acute toxicity (Oral)</td>
<td>Category 5</td>
</tr>
<tr>
<td>Acute toxicity (Inhalation)</td>
<td>Category 5</td>
</tr>
<tr>
<td>Acute toxicity (Dermal)</td>
<td>Category 5</td>
</tr>
<tr>
<td>Skin irritation</td>
<td>Category 2</td>
</tr>
<tr>
<td>Eye irritation</td>
<td>Category 2A</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Category 1B</td>
</tr>
<tr>
<td>Specific target organ systemic</td>
<td>Category 1 (Central nervous system)</td>
</tr>
<tr>
<td>toxicity - repeated exposure</td>
<td></td>
</tr>
<tr>
<td>Short-term (acute) aquatic</td>
<td>Category 1</td>
</tr>
<tr>
<td>hazard</td>
<td></td>
</tr>
<tr>
<td>Long-term (chronic) aquatic</td>
<td>Category 1</td>
</tr>
<tr>
<td>hazard</td>
<td></td>
</tr>
</tbody>
</table>
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Fluralaner / Moxidectin Liquid Formulation

Version 4.0  Revision Date: 10/18/2018  SDS Number: 656874-00009  Date of last issue: 12.04.2018

GHS label elements in accordance with ABNT NBR 14725 Standard

Hazard pictograms:
- Flammable: !
- Skin hazard: 
- Eye hazard: 
- Harmful: 

Signal Word: Danger

Hazard Statements:
- H225 Highly flammable liquid and vapor.
- H303 + H313 + H333 May be harmful if swallowed, in contact with skin or if inhaled.
- H315 Causes skin irritation.
- H319 Causes serious eye irritation.
- H360D May damage the unborn child.
- H372 Causes 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.
- P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
- P312 Call a POISON CENTER/doctor if you feel unwell.
- P391 Collect spillage.

Additional Labeling
The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 20 %

Other hazards which do not result in classification
Vapors may form explosive mixture with air.

SECTION 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>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylacetamide</td>
<td>127-19-5</td>
<td>&gt;= 30 &lt; 50</td>
</tr>
<tr>
<td>Fluralaner</td>
<td>864731-61-3</td>
<td>&gt;= 25 &lt; 30</td>
</tr>
<tr>
<td>N,N-Diethyl-m-toluamide</td>
<td>134-62-3</td>
<td>&gt;= 10 &lt; 20</td>
</tr>
<tr>
<td>Acetone</td>
<td>67-64-1</td>
<td>&gt;= 10 &lt; 20</td>
</tr>
<tr>
<td>Moxidectin</td>
<td>113507-06-5</td>
<td>&gt;= 1 &lt; 2,5</td>
</tr>
<tr>
<td>2,6-Di-tert-butyl-p-cresol</td>
<td>128-37-0</td>
<td>&gt;= 0,1 &lt; 0,25</td>
</tr>
</tbody>
</table>

SECTION 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 for at least 15 minutes while removing 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.

### Most important symptoms and effects, both acute and delayed
- May be harmful if swallowed, in contact with skin or if inhaled. Causes skin irritation. Causes serious eye irritation. May damage the unborn child. Causes 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.

### Notes to physician
- Treat symptomatically and supportively.

### SECTION 5. FIRE-FIGHTING MEASURES

| Suitable extinguishing media | Water spray
|                            | Alcohol-resistant foam
|                            | Carbon dioxide (CO2)
|                            | Dry chemical
| Unsuitable extinguishing media | High volume water jet
| Specific hazards during fire fighting | Do not use a solid water stream as it may scatter and spread fire. Flash back possible over considerable distance. Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
| Hazardous combustion products | Carbon oxides
|                             | Chlorine compounds
|                             | Fluorine compounds
|                             | 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.

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

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
- Remove all sources of ignition.
- Ventilate the area.
- Use personal protective equipment.
- Follow safe handling advice 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:
- Non-sparking tools should be used.
- Soak up with inert absorbent material.
- Suppress (knock down) gases/vapors/mists with a water spray jet.
- For large spills, provide diking or other appropriate containment to keep material from spreading. If diked 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.

SECTION 7. HANDLING AND STORAGE

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

Local/Total ventilation:
- Use with local exhaust ventilation.
- Use only in an area equipped with explosion-proof exhaust ventilation if advised by assessment of the local exposure potential.

Advice on safe handling:
- Do not get on skin or clothing.
- Do not breathe vapors 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.
- Non-sparking tools should be used.
- Keep container tightly closed.
Keep away from heat and sources of ignition.
Take precautionary measures against static discharges.
Take care to prevent spills, waste and minimize release to the environment.

Hygiene measures:
- Ensure that eye flushing systems and safety showers are located 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.

Conditions for safe storage:
- Keep in properly labeled containers.
- Store locked up.
- Keep tightly closed.
- Keep in a cool, well-ventilated place.
- Store in accordance with the particular national regulations.
- Keep away from heat and sources of ignition.

Materials to avoid:
- Do not store with the following product types:
  - Strong oxidizing agents
  - Organic peroxides
  - Flammable solids
  - Pyrophoric liquids
  - Pyrophoric solids
  - Self-heating substances and mixtures
  - Substances and mixtures which in contact with water emit flammable gases
  - Explosives
  - Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients 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>N,N-Dimethylacetamide</td>
<td>127-19-5</td>
<td>LT</td>
<td>8 ppm 28 mg/m³</td>
<td>BR OEL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Further information: Absorption through the skin, Degree of harmfulness: maximum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>10 ppm ACGIH</td>
<td></td>
</tr>
<tr>
<td>Fluralaner</td>
<td>864731-61-3</td>
<td>TWA</td>
<td>100 µg/m³ (OEB 2)</td>
<td>Internal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Further information: Skin</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wipe limit</td>
<td>1000 µg/100 cm²</td>
<td>Internal</td>
</tr>
<tr>
<td>Acetone</td>
<td>67-64-1</td>
<td>LT</td>
<td>780 ppm 1.870 mg/m³</td>
<td>BR OEL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Further information: Degree of harmfulness: minimum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>250 ppm ACGIH</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>500 ppm ACGIH</td>
<td></td>
</tr>
<tr>
<td>Moxidectin</td>
<td>113507-06-5</td>
<td>TWA</td>
<td>10 µg/m³ (OEB 3)</td>
<td>Internal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wipe limit</td>
<td>100 µg/100 cm²</td>
<td>Internal</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

2,6-Di-tert-butyl-p-cresol

<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,N-Dimethylacetamide</td>
<td>127-19-5</td>
<td>N-Methylacetamide</td>
<td>Urine</td>
<td>End of shift at end of week</td>
<td>30 mg/g Creatinine</td>
<td>ACGIH BEI</td>
</tr>
<tr>
<td>Acetone</td>
<td>67-64-1</td>
<td>Acetone</td>
<td>Urine</td>
<td>End of shift (As soon as possible after exposure ceases)</td>
<td>25 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., 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

Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

Filter type: Self-contained breathing apparatus

Hand protection

Material: Chemical-resistant gloves

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

Eye protection

Wear safety glasses with side shields or goggles.

If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles.

Wear a faceshield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.

Skin and body protection

Work uniform or laboratory coat.

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

### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>liquid</td>
</tr>
<tr>
<td>Color</td>
<td>clear</td>
</tr>
<tr>
<td>Odor</td>
<td>No information available.</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>2 °C</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability (liquids)</td>
<td>Not applicable</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>Vapor pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density</td>
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</tr>
<tr>
<td>Relative density</td>
<td>1,06</td>
</tr>
<tr>
<td>Density</td>
<td>No data available</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td></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>Autoignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td></td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not explosive</td>
</tr>
</tbody>
</table>
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Fluralaner / Moxidectin Liquid Formulation

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

Particle size: Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Not classified as a reactivity hazard.
Chemical stability: Stable under normal conditions.
Possibility of hazardous reactions:
- Highly flammable liquid and vapor.
- Vapors may form explosive mixture with air.
- Can react with strong oxidizing agents.

Conditions to avoid: Heat, flames and sparks.
Incompatible materials: Oxidizing agents
Hazardous decomposition products: No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

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

Acute toxicity
May be harmful if swallowed, in contact with skin or if inhaled.

Product:

Acute oral toxicity: Acute toxicity estimate: 3.548 mg/kg
Method: Calculation method

Acute inhalation toxicity: Acute toxicity estimate: 5.3 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: Calculation method

Acute dermal toxicity: Acute toxicity estimate: 2.827 mg/kg
Method: Calculation method

Components:

N,N-Dimethylacetamide:

Acute oral toxicity: LD50 (Rat): 4.800 mg/kg

Acute inhalation toxicity: LC50 (Rat): 2.2 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity: Acute toxicity estimate: 1.100 mg/kg
Method: Expert judgment
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI
Fluralaner:

Acute oral toxicity: LD50 (Rat): > 2.000 mg/kg
Remarks: No mortality observed at this dose. No significant adverse effects were reported

Acute dermal toxicity: LD50 (Rat): > 2.000 mg/kg
Remarks: No significant adverse effects were reported

N,N-Diethyl-m-toluamide:

Acute oral toxicity: LD50 (Rat): 1.950 mg/kg

Acute inhalation toxicity: LC50 (Rat): 5,95 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity: LD50 (Rat): 5.000 mg/kg

Acetone:

Acute oral toxicity: LD50 (Rat): 5.800 mg/kg

Acute inhalation toxicity: LC50 (Rat): 76 mg/l
Exposure time: 4 h
Test atmosphere: vapor

Acute dermal toxicity: LD50 (Rabbit): 7.426 mg/kg

Moxidectin:

Acute oral toxicity: LD50 (Rat): 106 mg/kg
LD50 (Mouse): 42 - 84 mg/kg

Acute inhalation toxicity: LC50 (Rat): 3,28 mg/l
Exposure time: 5 h
Test atmosphere: dust/mist
LC50 (Rat): 2,87 - 4,06 mg/l
Test atmosphere: dust/mist

Acute dermal toxicity: LD50 (Rat): > 2.000 mg/kg
Remarks: No significant adverse effects were reported

Acute toxicity (other routes of administration): LD50 (Rat): 394 mg/kg
Application Route: Intraperitoneal
LD50 (Mouse): 84 mg/kg
Application Route: Intraperitoneal
LD50 (Rat): > 640 mg/kg
Application Route: Subcutaneous
LD50 (Mouse): 263 mg/kg
Application Route: Subcutaneous
2,6-Di-tert-butyl-p-cresol:

- **Acute oral toxicity**: LD50 (Rat): > 6,000 mg/kg
  - Method: OECD Test Guideline 401

- **Acute dermal toxicity**: LD50 (Rat): > 2,000 mg/kg
  - Method: OECD Test Guideline 402
  - Assessment: The substance or mixture has no acute dermal toxicity

**Skin corrosion/irritation**

Causes skin irritation.

**Components:**

**N,N-Dimethylacetamide:**

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

**Fluralaner:**

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

**N,N-Diethyl-m-toluamide:**

- **Species**: Rabbit
- **Result**: Skin irritation

**Acetone:**

- **Assessment**: Repeated exposure may cause skin dryness or cracking.

**Moxidectin:**

- **Species**: Rabbit
- **Result**: Mild skin irritant

**2,6-Di-tert-butyl-p-cresol:**

- **Species**: Rabbit
- **Method**: OECD Test Guideline 404
- **Result**: No skin irritation
- **Remarks**: Based on data from similar materials

**Serious eye damage/eye irritation**

Causes serious eye irritation.

**Components:**

**N,N-Dimethylacetamide:**

- **Species**: Rabbit
- **Result**: Irritation to eyes, reversing within 21 days

**Fluralaner:**

- **Species**: Rabbit
### Result: Mild eye irritant

**N,N-Diethyl-m-toluamide:**
- **Species:** Rabbit
- **Result:** Irritation to eyes, reversing within 21 days

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

**Moxidectin:**
- **Species:** Rabbit
- **Result:** Moderate eye irritation

**2,6-Di-tert-butyl-p-cresol:**
- **Species:** Rabbit
- **Result:** No eye irritation
- **Method:** OECD Test Guideline 405
- **Remarks:** Based on data from similar materials

### Respiratory or skin sensitization

**Skin sensitization**
Not classified based on available information.

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

### Components:

**N,N-Dimethylacetamide:**
- **Routes of exposure:** Skin contact
- **Species:** Guinea pig
- **Result:** negative

**Fluralaner:**
- **Test Type:** Maximization Test
- **Routes of exposure:** Dermal
- **Species:** Guinea pig
- **Result:** Not a skin sensitizer.

**Acetone:**
- **Test Type:** Maximization Test
- **Routes of exposure:** Skin contact
- **Species:** Guinea pig
- **Result:** negative

**Moxidectin:**
- **Test Type:** Buehler Test
Routes of exposure: Dermal
Species: Guinea pig
Result: Not a skin sensitizer.

2,6-Di-tert-butyl-p-cresol:
Test Type: Human repeat insult patch test (HRIPT)
Routes of exposure: Skin contact
Species: Humans
Result: negative

Germ cell mutagenicity
Not classified based on available information.

Components:

N,N-Dimethylacetamide:
Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Genotoxicity in vivo: Test Type: Rodent dominant lethal test (germ cell) (in vivo)
Species: Rat
Application Route: Inhalation
Method: OECD Test Guideline 478
Result: negative

Fluralaner:
Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Test Type: Mouse Lymphoma
Result: negative
Test Type: Chromosomal aberration
Result: negative
Genotoxicity in vivo: Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: Oral
Result: negative

N,N-Diethyl-m-toluamide:
Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Acetone:
Genotoxicity in vitro: Test Type: In vitro mammalian cell gene mutation test
Result: negative
Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
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<table>
<thead>
<tr>
<th>Test Type</th>
<th>Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Genotoxicity in vitro</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chromosome aberration test in vitro</td>
<td></td>
<td>negative</td>
</tr>
<tr>
<td><strong>Moxidectin:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genotoxicity in vitro</td>
<td>Test Type: Bacterial reverse mutation assay (AMES)</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Test Type: In vitro mammalian cell gene mutation test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test system: Chinese hamster ovary cells</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Test Type: in vitro test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test system: Escherichia coli</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Chromosomal aberration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Species: Rat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cell type: Bone marrow</td>
<td>negative</td>
</tr>
<tr>
<td></td>
<td>Unscheduled DNA synthesis (UDS) test with mammalian liver cells in vivo</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Species: Rat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cell type: Liver cells</td>
<td>negative</td>
</tr>
<tr>
<td>Genotoxicity in vivo</td>
<td>Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Species: Rat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application Route: Ingestion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Result: negative</td>
<td></td>
</tr>
</tbody>
</table>

#### Carcinogenicity

Not classified based on available information.
Components:

N,N-Dimethylacetamide:
- **Species**: Rat
- **Application Route**: inhalation (vapor)
- **Exposure time**: 18 month(s)
- **Result**: negative

Fluralaner:
- **Carcinogenicity - Assessment**: No data available

N,N-Diethyl-m-toluamide:
- **Species**: Rat
- **Application Route**: Ingestion
- **Exposure time**: 104 weeks
- **Result**: negative

Acetone:
- **Species**: Mouse
- **Application Route**: Skin contact
- **Exposure time**: 424 days
- **Result**: negative

Moxidectin:
- **Species**: Mouse
  - **Application Route**: Oral
  - **Exposure time**: 2 Years
  - **NOAEL**: 4,5 mg/kg body weight
  - **Result**: negative
- **Species**: Rat
  - **Application Route**: Oral
  - **Exposure time**: 2 Years
  - **NOAEL**: 4,5 mg/kg body weight
  - **Result**: negative
- **Species**: Dog
  - **Application Route**: Oral
  - **Exposure time**: 1 Years
  - **NOAEL**: 0,5 mg/kg body weight
  - **Result**: negative

2,6-Di-tert-butyl-p-cresol:
- **Species**: Rat
- **Application Route**: Ingestion
- **Exposure time**: 22 Months
- **Result**: negative
Reproductive toxicity
May damage the unborn child.

Components:

N,N-Dimethylacetamide:

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Species</th>
<th>Application Route</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects on fertility</td>
<td>Rat</td>
<td>Inhalation</td>
<td>negative</td>
<td></td>
</tr>
<tr>
<td>Effects on fetal development</td>
<td>Rat</td>
<td>Inhalation</td>
<td>positive</td>
<td></td>
</tr>
</tbody>
</table>

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

Fluralaner:

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Species</th>
<th>Application Route</th>
<th>General Toxicity Parent</th>
<th>General Toxicity F1</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects on fertility</td>
<td>Rat</td>
<td>Oral</td>
<td>NOAEL: 50 mg/kg body weight</td>
<td>LOAEL: 100 mg/kg body weight</td>
<td>No effects on fertility, Postimplantation loss, Adverse neonatal effects.</td>
<td></td>
</tr>
<tr>
<td>Effects on fetal development</td>
<td>Rat</td>
<td>Oral</td>
<td>NOAEL: 75 mg/kg body weight</td>
<td></td>
<td>No effects on fertility and early embryonic development were detected.</td>
<td>No significant adverse effects were reported</td>
</tr>
</tbody>
</table>

Developmental Toxicity:

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Species</th>
<th>Application Route</th>
<th>Developmental Toxicity</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects on fertility</td>
<td>Rat</td>
<td>Oral</td>
<td>NOAEL: 100 mg/kg body weight</td>
<td>Embryotoxic effects and adverse effects on the offspring were detected only at high maternally toxic doses, No teratogenic effects.</td>
<td></td>
</tr>
<tr>
<td>Effects on fetal development</td>
<td>Rat</td>
<td>Oral</td>
<td>NOAEL: 10 mg/kg body weight</td>
<td>Skeletal malformations, Visceral malformations.</td>
<td>Maternal toxicity observed.</td>
</tr>
<tr>
<td>Effects on fetal development</td>
<td>Rabbit</td>
<td>Oral</td>
<td>NOAEL: 100 mg/kg body weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects on fetal development</td>
<td>Rabbit</td>
<td>Dermal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Result: Skeletal malformations.

Reproductive toxicity - Assessment:

**N,N-Diethyl-m-toluamide:**

- Effects on fetal development:
  - Test Type: Embryo-fetal development
  - Species: Rat
  - Application Route: Ingestion
  - Result: negative

**Acetone:**

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

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

**Moxidectin:**

- Effects on fertility:
  - Test Type: Two-generation reproduction toxicity study
  - Species: Rat
  - Application Route: Oral
  - General Toxicity F1: LOAEL: 0.8 mg/kg body weight
  - Symptoms: Reduced fetal weight, Fetal mortality.
  - Result: No effects on fertility, Some evidence of adverse effects on development, based on animal experiments.

  - Test Type: Three-generation reproduction toxicity study
  - Species: Rat
  - Application Route: Oral
  - General Toxicity F1: LOAEL: 0.8 mg/kg body weight
  - Symptoms: Reduced fetal weight, Fetal mortality.
  - Result: No effects on fertility, Some evidence of adverse effects on development, based on animal experiments.

- Effects on fetal development:
  - Test Type: Embryo-fetal development
  - Species: Rat
  - Application Route: Oral
  - General Toxicity Maternal: LOAEL: 10 mg/kg body weight
  - Embryo-fetal toxicity: LOAEL: 10 mg/kg body weight
  - Result: Skeletal malformations.
  - Remarks: The effects were seen only at maternally toxic doses.

  - Test Type: Embryo-fetal development
  - Species: Rabbit
  - Application Route: Oral
  - General Toxicity Maternal: LOAEL: 5 mg/kg body weight
  - Developmental Toxicity: NOAEL: 10 mg/kg body weight
  - Result: No teratogenic effects, No embryotoxic effects.
Reproductive toxicity - Assessment: Some evidence of adverse effects on development, based on animal experiments.

**2,6-Di-tert-butyl-p-cresol:**

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

Effects on fetal development:
- Test Type: Embryo-fetal development
  - Species: Rat
  - Application Route: Ingestion
  - Result: negative

**STOT-single exposure**

Not classified based on available information.

**Components:**

**Acetone:**
- Assessment: May cause drowsiness or dizziness.

**STOT-repeated exposure**

Causes damage to organs (Central nervous system) through prolonged or repeated exposure.

**Components:**

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

**2,6-Di-tert-butyl-p-cresol:**
- Assessment: No significant health effects observed in animals at concentrations of 100 mg/kg bw or less.

**Repeated dose toxicity**

**Components:**

**N,N-Dimethylacetamide:**
- Species: Rat
  - NOAEL: 90 mg/m³
  - LOAEL: 360 mg/m³
  - Application Route: inhalation (vapor)
  - Exposure time: 24 Months

**Fluralaner:**
- Species: Dog
  - NOAEL: 1 mg/kg
  - Application Route: Oral
### Fluralaner / Moxidectin Liquid Formulation

| Exposure time | 52 Weeks |
| Target Organs | Liver |
| Remarks | No significant adverse effects were reported |
| Species | Juvenile dog |
| LOAEL | 56 - 280 mg/kg |
| Application Route | Oral |
| Exposure time | 24 Weeks |
| Symptoms | Diarrhea |

| Species | Rat |
| LOAEL | 400 mg/kg |
| Application Route | Oral |
| Exposure time | 90 Days |
| Target Organs | Liver, thymus |
| Remarks | No significant adverse effects were reported |

### Acetone:

| Species | Rat |
| NOAEL | 900 mg/kg |
| LOAEL | 1.700 mg/kg |
| Application Route | Ingestion |
| Exposure time | 90 Days |

| Species | Rat |
| NOAEL | 45 mg/l |
| Application Route | Inhalation (vapor) |
| Exposure time | 8 Weeks |

### Moxidectin:

| Species | Mouse |
| NOAEL | 3,9 mg/kg |
| LOAEL | 15,4 mg/kg |
| Application Route | Oral |
| Exposure time | 4 Weeks |
| Symptoms | Tremors |

| Species | Rat |
| NOAEL | 3,9 mg/kg |
| LOAEL | 7,9 mg/kg |
| Application Route | Oral |
| Exposure time | 13 Weeks |
| Target Organs | Central nervous system |
| Symptoms | Tremors, Salivation |

| Species | Dog |
| NOAEL | 0,3 mg/kg |
| LOAEL | 0,9 mg/kg |
SAFETY DATA SHEET

Fluralaner / Moxidectin Liquid Formulation

Application Route: Oral
Exposure time: 90 Days
Target Organs: Central nervous system
Symptoms: Tremors, Lachrymation, Salivation

Species: Dog
NOAEL: 0.3 mg/kg
LOAEL: 0.87 mg/kg
Application Route: Oral
Exposure time: 52 Weeks
Target Organs: Central nervous system
Symptoms: Tremors, Lachrymation

2,6-Di-tert-butyl-p-cresol:
Species: Rat
NOAEL: 25 mg/kg
Application Route: Ingestion
Exposure time: 22 Months

Aspiration toxicity
Not classified based on available information.

Components:

Fluralaner:
Not applicable

Experience with human exposure

Components:

Fluralaner:
Skin contact: Remarks: May irritate skin.
Eye contact: Remarks: May cause eye irritation.

Moxidectin:
Inhalation: Remarks: No human information is available.
Skin contact: Remarks: No human information is available.
Eye contact: Remarks: No human information is available.
Ingestion: Remarks: No human information is available.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Components:

N,N-Dimethylacetamide:
Toxicity to fish: LC50 (Leuciscus idus (Golden orfe)): > 500 mg/l
Exposure time: 96 h
Toxicity to daphnia and other: EC50 (Daphnia magna (Water flea)): > 500 mg/l
aquatic invertebrates

Exposure time: 48 h

Toxicity to algae

EC50 (Desmodesmus subspicatus (green algae)): > 500 mg/l
Exposure time: 72 h

EC10 (Desmodesmus subspicatus (green algae)): > 500 mg/l
Exposure time: 72 h

Toxicity to microorganisms

EC10: > 1.995 mg/l
Exposure time: 30 min

Fluralaner:

Toxicity to fish

LC50 (Oncorhynchus mykiss (rainbow trout)): > 0.0488 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates

EC50 (Daphnia magna (Water flea)): > 0.015 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: No toxicity at the limit of solubility.

Toxicity to algae

NOEC (Pseudokirchneriella subcapitata (green algae)): >= 0.08 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: No toxicity at the limit of solubility.

Toxicity to fish (Chronic toxicity)

NOEC (Zebrafish): >= 0.049 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 204
Remarks: No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

NOEC (Daphnia magna (Water flea)): 0.000047 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211

M-Factor (Chronic aquatic toxicity)

1.000

N,N-Diethyl-m-toluamide:

Toxicity to fish

LC50 (Pimephales promelas (fathead minnow)): 110 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates

EC50 (Daphnia magna (Water flea)): 75 mg/l
Exposure time: 48 h

Acetone:

Toxicity to fish

LC50 (Oncorhynchus mykiss (rainbow trout)): 5.540 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates

EC50 (Daphnia pulex (Water flea)): 8.800 mg/l
Exposure time: 48 h
## SAFETY DATA SHEET

### Fluralaner / Moxidectin 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>4.0</td>
<td>10/18/2018</td>
<td>656874-00009</td>
<td>12.04.2018</td>
<td>02.05.2016</td>
</tr>
</tbody>
</table>

#### Toxicity to algae

- NOEC (Pseudokirchneriella subcapitata (green algae)): 7,000 mg/l
  - Exposure time: 96 h

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

- NOEC (Daphnia magna (Water flea)): >= 79 mg/l
  - Exposure time: 21 d
  - Method: OECD Test Guideline 211

#### Toxicity to microorganisms

- EC50: 61,150 mg/l
  - Exposure time: 30 min
  - Method: ISO 8192

### Moxidectin:

#### Toxicity to fish

- LC50 (Lepomis macrochirus (Bluegill sunfish)): 0,0006 mg/l
  - Exposure time: 96 h
  - Method: OECD Test Guideline 203

- LC50 (Oncorhynchus mykiss (rainbow trout)): 0,0002 mg/l
  - Exposure time: 96 h
  - Method: OECD Test Guideline 203

#### Toxicity to daphnia and other aquatic invertebrates

- EC50 (Daphnia magna (Water flea)): 0,00003 mg/l
  - Exposure time: 48 h
  - Method: OECD Test Guideline 202

#### Toxicity to algae

- EC50 (Pseudokirchneriella subcapitata (green algae)): 0,087 mg/l
  - Exposure time: 72 h
  - Method: OECD Test Guideline 201

#### M-Factor (Acute aquatic toxicity)

- 10,000

#### M-Factor (Chronic aquatic toxicity)

- 10,000

### 2,6-Di-tert-butyl-p-cresol:

#### Toxicity to fish

- LC50 (Danio rerio (zebra fish)): > 0,57 mg/l
  - Exposure time: 96 h

#### Toxicity to daphnia and other aquatic invertebrates

- EC50 (Daphnia magna (Water flea)): 0,48 mg/l
  - Exposure time: 48 h
  - Method: OECD Test Guideline 202

#### Toxicity to algae

- ErC50 (Pseudokirchneriella subcapitata (green algae)): > 0,24 mg/l
  - Exposure time: 72 h
  - Method: OECD Test Guideline 201

- NOEC (Pseudokirchneriella subcapitata (green algae)): 0,24 mg/l
  - Exposure time: 72 h
  - Method: OECD Test Guideline 201
SAFETY DATA SHEET

Fluralaner / Moxidectin Liquid Formulation

Version 4.0  Revision Date: 10/18/2018  SDS Number: 656874-00009  Date of last issue: 12.04.2018
Date of first issue: 02.05.2016

M-Factor (Acute aquatic toxicity): 1
Toxicity to fish (Chronic toxicity): NOEC (Oryzias latipes (Japanese medaka)): 0,053 mg/l
Exposure time: 30 d
Method: OECD Test Guideline 210

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Daphnia magna (Water flea)): 0,316 mg/l
Exposure time: 21 d

M-Factor (Chronic aquatic toxicity): 1
Toxicity to microorganisms: EC50: > 10.000 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

Persistence and degradability

Components:

N,N-Dimethylacetamide:
Biodegradability: Result: Not readily biodegradable.
Biodegradation: 70 %
Exposure time: 28 d
Remarks: The 10 day time window criterion is not fulfilled.

N,N-Diethyl-m-toluamide:
Biodegradability: Result: Not readily biodegradable.

Acetone:
Biodegradability: Result: Readily biodegradable.
Biodegradation: 91 %
Exposure time: 28 d

2,6-Di-tert-butyl-p-cresol:
Biodegradability: Result: Not readily biodegradable.
Biodegradation: 4,5 %
Exposure time: 28 d
Method: OECD Test Guideline 301C

Bioaccumulative potential

Components:

Fluralaner:
Bioaccumulation: Species: Zebrafish
Bioconcentration factor (BCF): 79,4
Method: OECD Test Guideline 305
Partition coefficient: n-octanol/water: log Pow: 4,5

N,N-Diethyl-m-toluamide:
SAFETY DATA SHEET

Fluralaner / Moxidectin Liquid Formulation

Partition coefficient: n-octanol/water: log Pow: 2.02

Acetone:
Partition coefficient: n-octanol/water: log Pow: -0.27 - -0.23

Moxidectin:
Partition coefficient: n-octanol/water: log Pow: 4.7

2,6-Di-tert-butyl-p-cresol:
Bioaccumulation: Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 330 - 1.800
Partition coefficient: n-octanol/water: log Pow: 5.1

Mobility in soil

Components:

Fluralaner:
Distribution among environmental compartments: log Koc: 3.4

Other adverse effects

Components:

Fluralaner:
Results of PBT and vPvB assessment: This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues: Dispose of in accordance with local regulations.
Contaminated packaging: Empty containers should be taken to an approved waste handling site for recycling or disposal. Empty containers retain residue and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury and/or death. If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG
UN number: UN 1090
Proper shipping name: ACETONE SOLUTION
Class: 3
SAFETY DATA SHEET

Fluralaner / Moxidectin Liquid Formulation

Version 4.0  Revision Date: 10/18/2018  SDS Number: 656874-00009  Date of last issue: 12.04.2018
Date of first issue: 02.05.2016

Packing group : II
Labels : 3

IATA-DGR
UN/ID No. : UN 1090
Proper shipping name : Acetone solution
Class : 3
Packing group : II
Labels : Flammable Liquids
Packing instruction (cargo aircraft) : 364
Packing instruction (passenger aircraft) : 353

IMDG-Code
UN number : UN 1090
Proper shipping name : ACETONE SOLUTION
(Moxidectin, 2,6-Di-tert-butyl-p-cresol)
Class : 3
Packing group : II
Labels : 3
EmS Code : F-E, S-D
Marine pollutant : yes

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

Domestic regulation

ANTT
UN number : UN 1090
Proper shipping name : ACETONE, SOLUTION
Class : 3
Packing group : II
Labels : 3
Hazard Identification Number : 33

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.

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
National List of Carcinogenic Agents for Humans - (LINACH) : Not applicable

Brazil. Ordinance No. 1274 on the control and monitoring of chemicals. : Acetone
International Regulations

The ingredients of this product are reported in the following inventories:

- **AICS**: not determined
- **DSL**: not determined
- **IECSC**: not determined

SECTION 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.

Full text of other abbreviations

- **ACGIH**: USA. ACGIH Threshold Limit Values (TLV)
- **ACGIH BEI**: ACGIH - Biological Exposure Indices (BEI)
- **BR OEL**: Brazil. Occupational Exposure Limits
- **ACGIH / TWA**: 8-hour, time-weighted average
- **ACGIH / STEL**: Short-term exposure limit
- **BR OEL / LT**: Up to 48 hours /week

- **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; **CPR**: Controlled Products Regulations; **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-
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.