Dow AgroSciences Canada Inc. encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name
Spectrum* A Herbicide

COMPANY IDENTIFICATION
Dow AgroSciences Canada Inc.
A Subsidiary of The Dow Chemical Company
Suite 2100, 450 1st Street SW
Calgary, AB T2P 5H1
Canada

For MSDS updates and Product Information: 800-667-3852
Revision 2014.01.22
Customer Information Number: 800-667-3852
solutions@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 613-996-6666
Local Emergency Contact: 613-996-6666

2. Hazards Identification

Emergency Overview
Color: White to off-white
Physical State: Liquid
Odor: Mild
Hazard of product:
No significant immediate hazards for emergency response are known.
Potential Health Effects
Eye Contact: Essentially nonirritating to eyes.
Skin Contact: Brief contact is essentially nonirritating to skin.
Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.
Inhalation: Vapors are primarily water; single exposure is not likely to be hazardous. No adverse effects are anticipated from single exposure to mist. Excessive exposure may cause irritation to upper respiratory tract (nose and throat). Based on the available data, narcotic effects were not observed.
Ingestion: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.
Aspiration hazard: Based on physical properties, not likely to be an aspiration hazard.
Effects of Repeated Exposure: For the active ingredient(s): In animals, effects have been reported on the following organs: Kidney. Liver. For the minor component(s): In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount W/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florasulam</td>
<td>145701-23-1</td>
<td>4.8 %</td>
</tr>
<tr>
<td>Propylene glycol</td>
<td>57-55-6</td>
<td>8.6 %</td>
</tr>
<tr>
<td>Balance</td>
<td>Not available</td>
<td>86.6 %</td>
</tr>
</tbody>
</table>

Amounts are presented as percentages by weight.

4. First-aid measures

Description of first aid measures
General advice: If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice.
Skin Contact: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
Eye Contact: Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. Call a poison control center or doctor for treatment advice.
Ingestion: No emergency medical treatment necessary.
Most important symptoms and effects, both acute and delayed
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.
Indication of immediate medical attention and special treatment needed
No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data Sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

5. Fire Fighting Measures

Suitable extinguishing media
This material does not burn. If exposed to fire from another source, use suitable extinguishing agent for that fire.
Special hazards arising from the substance or mixture
Hazardous Combustion Products: Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Combustion products may include trace amounts of: Sulfur oxides. Nitrogen oxides. Hydrogen halides.

Unusual Fire and Explosion Hazards: If exposed to fire from another source and water is evaporated, exposure to high temperatures may cause toxic fumes.

Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. This material does not burn. Fight fire for other material that is burning. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the “Accidental Release Measures” and the “Ecological Information” sections of this (M)SDS.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

See Section 9 for related Physical Properties

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Absorb with materials such as: Clay. Dirt. Sand. Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling
General Handling: Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor or mist. Wash thoroughly after handling. Use with adequate ventilation. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage
Store in a dry place. Store in original container. Keep container tightly closed when not in use. Do not store near food, foodstuffs, drugs or potable water supplies.

To maintain product quality, recommended storage temperature is > -5 °C

8. Exposure Controls / Personal Protection

<table>
<thead>
<tr>
<th>Component</th>
<th>List</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene glycol</td>
<td>WEEL</td>
<td>TWA</td>
<td>10 mg/m3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aerosol.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAD ON OEL</td>
<td>TWAEV Total vapor and aerosol.</td>
<td>155 mg/m3 50 ppm</td>
</tr>
</tbody>
</table>
Consult local authorities for recommended exposure limits.
RECOMMENDATIONS IN THIS SECTION ARE FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS. APPLICATORS AND HANDLERS SHOULD SEE THE PRODUCT LABEL FOR PROPER PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING.

Personal Protection
Eye/Face Protection: Use safety glasses (with side shields).
Skin Protection: Wear clean, body-covering clothing.
Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Butyl rubber. Polyethylene. Ethyl vinyl alcohol laminate (“EVAL”). Natural rubber (“latex”). Neoprene. Nitrile/butadiene rubber (“nitrile” or “NBR”). Polyvinyl chloride (“PVC” or “vinyl”). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.
Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions no respiratory protection should be needed; however, if discomfort is experienced, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.
Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls
Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

### 9. Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Physical State</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>White to off-white</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>Mild</td>
<td></td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>4.36 (@ 1 %)</td>
<td></td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Freezing Point</td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td>Boiling Point (760 mmHg)</td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td>Flash Point - Closed Cup</td>
<td>Pensky-Martens Closed Cup ASTM D 93 none below boiling point</td>
<td></td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td>Flammable Limits In Air</td>
<td>Lower: No test data available</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Upper: No test data available</td>
<td></td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Vapor Density (air = 1)</td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td>Specific Gravity (H2O = 1)</td>
<td>1.0318 Digital Density Meter (Oscillating Coil)</td>
<td></td>
</tr>
<tr>
<td>Solubility in water (by weight)</td>
<td>No test data available</td>
<td></td>
</tr>
<tr>
<td>Partition coefficient, n-octanol/water (log Pow)</td>
<td>No data available for this product. See Section 12 for individual component data.</td>
<td></td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>EC Method A15 none below 400degC</td>
<td></td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>No test data available</td>
<td></td>
</tr>
</tbody>
</table>
10. Stability and Reactivity

Reactivity
No dangerous reaction known under conditions of normal use.

Chemical stability
Thermally stable at typical use temperatures.

Possibility of hazardous reactions
Polymerization will not occur.

Conditions to Avoid: Active ingredient decomposes at elevated temperatures.

Incompatible Materials: None known.

Hazardous decomposition products
Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information

Acute Toxicity

Ingestion
As product: LD50, rat, male and female > 5,000 mg/kg

Dermal
As product: LD50, rat, male and female > 2,000 mg/kg
No deaths occurred at this concentration.

Inhalation
As product: The LC50 has not been determined. Based on information for component(s): Estimated. LC50, 4 h, Aerosol, rat > 5 mg/l

Eye damage/eye irritation
Essentially nonirritating to eyes.

Skin corrosion/irritation
Brief contact is essentially nonirritating to skin.

Sensitization

Skin
Did not demonstrate the potential for contact allergy in mice. Did not cause allergic skin reactions when tested in guinea pigs.

Respiratory
No relevant data found.

Repeated Dose Toxicity
Repeated skin application to laboratory animals did not produce systemic toxicity. For the active ingredient(s): In animals, effects have been reported on the following organs: Kidney. Liver. For the minor component(s): In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

Chronic Toxicity and Carcinogenicity
For the active ingredient(s): Did not cause cancer in laboratory animals.

Developmental Toxicity
For the active ingredient(s): Did not cause birth defects or other effects in the fetus even at doses which caused toxic effects in the mother.

Reproductive Toxicity
For the active ingredient(s): In animal studies, did not interfere with reproduction.

Kinematic Viscosity
No test data available

Explosive properties
Not explosive

Oxidizing properties
No significant increase (>5C) in temperature.

Liquid Density
1.0318 g/cm3 @ 20 °C Digital density meter
Genetic Toxicology
For the active ingredient(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

12. Ecological Information

Toxicity
Material is very highly toxic to aquatic organisms on an acute basis (LC50/EC50 <0.1 mg/L in the most sensitive species). Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg).

Fish Acute & Prolonged Toxicity
LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 h: > 100 mg/l

Aquatic Invertebrate Acute Toxicity
EC50, Daphnia magna (Water flea), 48 h, immobilization: > 100 mg/l

Aquatic Plant Toxicity
EC50, Lemna minor (duckweed), Growth inhibition (cell density reduction), 14 d: 0.0466 mg/l
EbC50, Pseudokirchneriella subcapitata (green algae), static test, biomass growth inhibition, 72 h: 0.0611 mg/l

Toxicity to Above Ground Organisms
oral LD50, Anas platyrhynchos (Mallard duck): > 2250 mg/kg bodyweight.
oral LD50, Apis mellifera (bees): > 70.25 ug/bee
contact LD50, Apis mellifera (bees): > 100 ug/bee

Toxicity to Soil Dwelling Organisms
LC50, Eisenia fetida (earthworms): > 1,033 mg/kg

Persistence and Degradability

Data for Component: Florasulam
Material is expected to biodegrade only very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.

Stability in Water (1/2-life):
> 30 d

OECD Biodegradation Tests:

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 %</td>
<td>28 d</td>
<td>OECD 301B Test</td>
<td>fail</td>
</tr>
</tbody>
</table>

Indirect Photodegradation with OH Radicals
Rate Constant: 7.04E-11 cm3/s
Atmospheric Half-life: 1.82 h
Method: Estimated.

Theoretical Oxygen Demand: 0.85 mg/mg

Data for Component: Propylene glycol
Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
Biodegradation may occur under anaerobic conditions (in the absence of oxygen).

OECD Biodegradation Tests:

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>81 %</td>
<td>28 d</td>
<td>OECD 301F Test</td>
<td>pass</td>
</tr>
<tr>
<td>96 %</td>
<td>64 d</td>
<td>OECD 306 Test</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Indirect Photodegradation with OH Radicals
Rate Constant: 1.28E-11 cm3/s
Atmospheric Half-life: 10 h
Method: Estimated.

Biological oxygen demand (BOD):
BOD 5  69.0 %
BOD 10  70.0 %
BOD 20  86.0 %
BOD 28

Chemical Oxygen Demand: 1.53 mg/mg
Theoretical Oxygen Demand: 1.68 mg/mg
Bioaccumulative potential

Data for Component: Florasulam

- **Bioaccumulation**: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
- **Partition coefficient, n-octanol/water (log Pow)**: -1.22
- **Bioconcentration Factor (BCF)**: 0.8; Fish; Measured

Data for Component: Propylene glycol

- **Bioaccumulation**: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
- **Partition coefficient, n-octanol/water (log Pow)**: -1.07; Measured
- **Bioconcentration Factor (BCF)**: 0.09; Estimated

Mobility in soil

Data for Component: Florasulam

- **Mobility in soil**: Potential for mobility in soil is very high (Koc between 0 and 50).
- **Partition coefficient, soil organic carbon/water (Koc)**: 4 - 54
- **Henry’s Law Constant (H)**: 4.35E-07 Pa*m³/mole.; 20 °C

Data for Component: Propylene glycol

- **Mobility in soil**: Given its very low Henry’s constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process., Potential for mobility in soil is very high (Koc between 0 and 50).
- **Partition coefficient, soil organic carbon/water (Koc)**: < 1; Estimated.
- **Henry’s Law Constant (H)**: 1.2E-08 atm*m³/mole; Measured

13. Disposal Considerations

If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

14. Transport Information

**TDG Small container**
NOT REGULATED

**TDG Large container**
NOT REGULATED

**IMDG**

- **Proper Shipping Name**: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
- **Technical Name**: Florasulam
- **Hazard Class**: 9
- **ID Number**: UN3082
- **Packing Group**: PG III
- **EMS Number**: F-A,S-F
- **Marine pollutant**: Yes

**ICAO/IATA**

- **Proper Shipping Name**: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
- **Technical Name**: Florasulam
- **Hazard Class**: 9
- **ID Number**: UN3082
- **Packing Group**: PG III
15. Regulatory Information

CEPA - Domestic Substances List (DSL)
All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

Hazardous Products Act Information: CPR Compliance
This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Hazardous Products Act Information: WHMIS Classification
This product is exempt under WHMIS.

Pest Control Products Act Registration number: 27031

National Fire Code of Canada
Not applicable

16. Other Information

Hazard Rating System

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Recommended Uses and Restrictions

Identified uses
Product use: End use herbicide product

Revision
Identification Number: 58401 / 1023 / Issue Date 2014.01.22 / Version: 7.5
DAS Code: EF-1343
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Not available</td>
</tr>
<tr>
<td>W/W</td>
<td>Weight/Weight</td>
</tr>
<tr>
<td>OEL</td>
<td>Occupational Exposure Limit</td>
</tr>
<tr>
<td>STEL</td>
<td>Short Term Exposure Limit</td>
</tr>
<tr>
<td>TWA</td>
<td>Time Weighted Average</td>
</tr>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental industrial hygienists, Inc.</td>
</tr>
<tr>
<td>DOW IHG</td>
<td>Dow Industrial Hygiene Guideline</td>
</tr>
<tr>
<td>WEEL</td>
<td>Workplace Environmental Exposure Level</td>
</tr>
<tr>
<td>HAZ DES</td>
<td>Hazard Designation</td>
</tr>
<tr>
<td>VOL/VOL</td>
<td>Volume/Volume</td>
</tr>
</tbody>
</table>

Dow AgroSciences Canada Inc. urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer’s/user’s responsibility to ensure that his
activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.
Dow AgroSciences Canada Inc. encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name
Spectrum* B Herbicide

COMPANY IDENTIFICATION
Dow AgroSciences Canada Inc.
A Subsidiary of The Dow Chemical Company
Suite 2100, 450 1st Street SW
Calgary, AB T2P 5H1
Canada

For MSDS updates and Product Information: 800-667-3852
Revision 2014.01.13
Customer Information Number: 800-667-3852
solutions@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 613-996-6666
Local Emergency Contact: 613-996-6666

2. Hazards Identification

Emergency Overview
Color: Yellow
Physical State: Liquid
Odor: Sweet

Hazard of product:

CAUTION! Combustible liquid and vapor. May cause eye irritation. May cause skin irritation. May be harmful if inhaled. May cause central nervous system effects. May cause anesthetic effects. May be harmful if swallowed. Aspiration hazard. Can enter lungs and cause damage. Vapor explosion hazard. Vapors may travel a long distance; ignition and/or flash back may occur. Isolate area. Keep upwind of spill. Stay out of low areas. Toxic fumes may be released in fire situations. Highly toxic to fish and/or other aquatic organisms. Possible cancer hazard. May cause cancer based on animal data.
Potential Health Effects

**Eye Contact:** May cause moderate eye irritation. May cause slight temporary corneal injury. In humans, eye irritation resulted from brief (minutes) exposure to cyclohexanone vapor concentration of 50 ppm and above.

**Skin Contact:** Brief contact is essentially nonirritating to skin. Prolonged contact may cause skin irritation with local redness.

**Skin Absorption:** Prolonged skin contact is unlikely to result in absorption of harmful amounts.

**Inhalation:** Prolonged excessive exposure to mist may cause adverse effects. May cause central nervous system effects. Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed. Excessive exposure may cause irritation to upper respiratory tract (nose and throat).

**Ingestion:** Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

**Aspiration hazard:** Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

**Effects of Repeated Exposure:** For similar active ingredient(s): 2-methyl-4-chlorophenoxyacetic acid (MCPA). Blood. Kidney. Liver. Testes. Based on information for component(s): In animals, effects have been reported on the following organs: Blood. Central nervous system. Kidney. Liver. Respiratory tract.

**Cancer Information:** For the minor component(s): Has caused cancer in laboratory animals. However, the relevance of this to humans is unknown.

**Birth Defects/Developmental Effects:** Clopyralid caused birth defects in test animals, but only at greatly exaggerated doses that were severely toxic to the mothers. No birth defects were observed in animals given clopyralid at doses several times greater than those expected during normal exposure. For the active ingredient(s): MCPA-2-ethylhexyl. Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Based on information for component(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Has caused birth defects in lab animals only at doses producing severe toxicity in the mother.

**Reproductive Effects:** Based on information for component(s): In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Cyclohexanone caused reduced growth and survival of offspring in an animal reproduction study. Dose levels producing this effect also caused central nervous system effects in parental animals.

### 3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount W/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,6-Dichloropicolinic acid (Clopyralid)</td>
<td>1702-17-6</td>
<td>4.94 %</td>
</tr>
<tr>
<td>MCPA 2-EHE: 2-Methyl-4-</td>
<td>29450-45-1</td>
<td>43.16 %</td>
</tr>
<tr>
<td>Chlorophenoxyacetic Acid 2-Ethylhexyl Ester</td>
<td>108-94-1</td>
<td>19.9 %</td>
</tr>
<tr>
<td>Cyclohexanone</td>
<td>64742-95-6</td>
<td>19.4 %</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), light aromatic consists of: 1,2,4-Trimethylbenzene</td>
<td>95-63-6</td>
<td>5.8 %</td>
</tr>
<tr>
<td>1,3,5-Trimethylbenzene</td>
<td>108-67-8</td>
<td>1.5 %</td>
</tr>
<tr>
<td>Cumene</td>
<td>98-82-8</td>
<td>0.7 %</td>
</tr>
<tr>
<td>Xylene</td>
<td>1330-20-7</td>
<td>0.1 %</td>
</tr>
<tr>
<td>Balance</td>
<td>Not available</td>
<td>4.5 %</td>
</tr>
</tbody>
</table>

Amounts are presented as percentages by weight.
4. First-aid measures

Description of first aid measures
General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice. If breathing is difficult, oxygen should be administered by qualified personnel.

Skin Contact: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

Eye Contact: Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. Call a poison control center or doctor for treatment advice. Suitable emergency eye wash facility should be available in work area.

Ingestion: Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of immediate medical attention and special treatment needed
Maintain adequate ventilation and oxygenation of the patient. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. The decision of whether to induce vomiting or not should be made by a physician. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data Sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

5. Fire Fighting Measures

Suitable extinguishing media
Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Special hazards arising from the substance or mixture
Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Hydrogen fluoride. Hydrogen chloride. Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Dense smoke is produced when product burns.

Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water.
Do not use direct water stream. May spread fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the “Accidental Release Measures” and the “Ecological Information” sections of this (M)SDS.

**Special Protective Equipment for Firefighters:** Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

See Section 9 for related Physical Properties

### 6. Accidental Release Measures

**Personal precautions, protective equipment and emergency procedures:** Isolate area. Keep unnecessary and unprotected personnel from entering the area. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Vapor explosion hazard. Keep out of sewers. Refer to Section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

**Environmental precautions:** Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Spills or discharge to natural waterways is likely to kill aquatic organisms.

**Methods and materials for containment and cleaning up:** Contain spilled material if possible. Pump with explosion-proof equipment. If available, use foam to smother or suppress. Small spills: Absorb with materials such as: Clay. Dirt. Sand. Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance. See Section 13, Disposal Considerations, for additional information.

### 7. Handling and Storage

**Handling**

**General Handling:** Keep out of reach of children. Keep away from heat, sparks and flame. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor or mist. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. No smoking, open flames or sources of ignition in handling and storage area. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Electrically ground and bond all equipment. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

**Other Precautions:** Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers.

**Storage**

Store in a dry place. Store in original container. Keep container tightly closed when not in use. Do not store near food, foodstuffs, drugs or potable water supplies. Minimize sources of ignition, such as static build-up, heat, spark or flame.
8. Exposure Controls / Personal Protection

### Exposure Limits

<table>
<thead>
<tr>
<th>Component</th>
<th>List</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,6-Dichloropicolinic acid (Clopyralid)</td>
<td>Dow IHG</td>
<td>TWA</td>
<td>10 mg/m3</td>
</tr>
<tr>
<td>Cyclohexanone</td>
<td>CAD AB OEL</td>
<td>TWA</td>
<td>80 mg/m3 20 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>TWA</td>
<td>20 ppm SKIN</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>STEL</td>
<td>50 ppm SKIN</td>
</tr>
<tr>
<td></td>
<td>CAD ON OEL</td>
<td>TWAEV</td>
<td>20 ppm SKIN</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>TWA</td>
<td>20 ppm SKIN</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>STEL</td>
<td>50 ppm SKIN</td>
</tr>
<tr>
<td></td>
<td>CAD ON OEL</td>
<td>STEL</td>
<td>50 ppm SKIN</td>
</tr>
<tr>
<td></td>
<td>CAD AB OEL</td>
<td>STEL</td>
<td>200 mg/m3 50 ppm</td>
</tr>
<tr>
<td></td>
<td>Dow IHG</td>
<td>TWA</td>
<td>7.5 ppm SKIN</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>CAD AB OEL</td>
<td>TWA</td>
<td>123 mg/m3 25 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>TWA</td>
<td>25 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD ON OEL</td>
<td>TWAEV</td>
<td>123 mg/m3 25 ppm</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>TWA</td>
<td>25 ppm</td>
</tr>
<tr>
<td></td>
<td>OEL (QUE)</td>
<td>TWA</td>
<td>123 mg/m3 25 ppm</td>
</tr>
<tr>
<td>1,3,5-Trimethylbenzene</td>
<td>CAD ON OEL</td>
<td>TWAEV</td>
<td>123 mg/m3 25 ppm</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>TWA</td>
<td>25 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD AB OEL</td>
<td>TWA</td>
<td>123 mg/m3 25 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>TWA</td>
<td>25 ppm</td>
</tr>
<tr>
<td></td>
<td>OEL (QUE)</td>
<td>TWA</td>
<td>123 mg/m3 25 ppm</td>
</tr>
<tr>
<td>Cumene</td>
<td>CAD AB OEL</td>
<td>TWA</td>
<td>246 mg/m3 50 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>TWA</td>
<td>25 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>STEL</td>
<td>75 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD ON OEL</td>
<td>TWAEV</td>
<td>50 ppm</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>TWA</td>
<td>50 ppm</td>
</tr>
<tr>
<td></td>
<td>OEL (QUE)</td>
<td>TWA</td>
<td>246 mg/m3 50 ppm</td>
</tr>
</tbody>
</table>

Consult local authorities for recommended exposure limits.

RECOMMENDATIONS IN THIS SECTION ARE FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS. APPLICATORS AND HANDLERS SHOULD SEE THE PRODUCT LABEL FOR PROPER PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING.

A “skin” notation following the inhalation exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.

It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

### Personal Protection

**Eye/Face Protection**: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.

**Skin Protection**: Wear clean, body-covering clothing.

**Hand protection**: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Polyethylene. Ethyl vinyl alcohol laminate (“EVAL”). Polyvinyl chloride (“PVC” or “vinyl”). Viton. Styrene/butadiene rubber. Examples of acceptable glove barrier materials
include: Nitrile/butadiene rubber ("nitrile" or "NBR"). Chlorinated polyethylene. Butyl rubber.
Natural rubber ("latex"). NOTICE: The selection of a specific glove for a particular application
and duration of use in a workplace should also take into account all relevant workplace factors
such as, but not limited to: Other chemicals which may be handled, physical requirements
(cut/puncture protection, dexterity, thermal protection), potential body reactions to glove
materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed
the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements
or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air
will depend on the specific operation and the potential airborne concentration of the material. For
emergency conditions, use an approved positive-pressure self-contained breathing apparatus. The
following should be effective types of air-purifying respirators: Organic vapor cartridge with a
particulate pre-filter.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in
the work area; wash hands and face before smoking or eating.

Engineering Controls
Ventilation: Use engineering controls to maintain airborne level below exposure limit requirements or
guidelines. If there are no applicable exposure limit requirements or guidelines, use only with
adequate ventilation. Local exhaust ventilation may be necessary for some operations.

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>Physical State</td>
<td>Yellow</td>
</tr>
<tr>
<td>Color</td>
<td>Yellow</td>
</tr>
<tr>
<td>Odor</td>
<td>Sweet</td>
</tr>
<tr>
<td>pH</td>
<td>2.8 pH Electrode (1% aqueous suspension)</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>No test data available</td>
</tr>
<tr>
<td>Boiling Point (760 mmHg)</td>
<td>155 °C Literature (cyclohexanone)</td>
</tr>
<tr>
<td>Flash Point - Closed Cup</td>
<td>57.9 °C Pensky-Martens Closed Cup ASTM D 93</td>
</tr>
<tr>
<td>Flammable Limits In Air</td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>No test data available</td>
</tr>
<tr>
<td>Upper</td>
<td>No test data available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>10 mmHg @ 23.5 °C</td>
</tr>
<tr>
<td>Vapor Density (air = 1)</td>
<td>&gt;1</td>
</tr>
<tr>
<td>Specific Gravity (H2O = 1)</td>
<td>1.1432 20 °C/4 °C Pyknometer</td>
</tr>
<tr>
<td>Solubility in water (by weight)</td>
<td>forms an emulsion</td>
</tr>
<tr>
<td>Partition coefficient, n-octanol/water (log Pow)</td>
<td>No data available for this product. See Section 12 for individual component data.</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>No test data available</td>
</tr>
<tr>
<td>Decomposition</td>
<td>No test data available</td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No test data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No test data available</td>
</tr>
<tr>
<td>Liquid Density</td>
<td>1.012 g/cm3</td>
</tr>
</tbody>
</table>

10. Stability and Reactivity

Reactivity
No dangerous reaction known under conditions of normal use.

Chemical stability
Thermally stable at typical use temperatures.
Possibility of hazardous reactions
Polymerization will not occur.

Conditions to Avoid: Some components of this product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers. Avoid contact with metals such as: Ferrous metals. Lead.

Hazardous decomposition products
Decomposition products depend upon temperature, air supply and the presence of other materials. Toxic gases are released during decomposition.

11. Toxicological Information

Acute Toxicity
Ingestion
As product: Single dose oral LD50 has not been determined.
For similar material(s): LD50, rat, female 1,478 mg/kg

Dermal
As product: The dermal LD50 has not been determined.
For similar material(s): LD50, rabbit > 2,000 mg/kg
No deaths occurred at this concentration.

Inhalation
As product: The LC50 has not been determined.
For similar material(s): LC50, 4 h, Aerosol, rat > 1.3 mg/l
Maximum attainable concentration. No deaths occurred at this concentration.

Eye damage/eye irritation
May cause moderate eye irritation. May cause slight temporary corneal injury. In humans, eye irritation resulted from brief (minutes) exposure to cyclohexanone vapor concentration of 50 ppm and above.

Skin corrosion/irritation
Brief contact is essentially nonirritating to skin. Prolonged contact may cause skin irritation with local redness.

Sensitization
Skin
For the active ingredient(s): Did not cause allergic skin reactions when tested in guinea pigs.

Respiratory
No relevant data found.

Repeated Dose Toxicity
For similar active ingredient(s): 2-methyl-4-chlorophenoxyacetic acid (MCPA). Blood. Kidney. Liver. Testes. Based on information for component(s): In animals, effects have been reported on the following organs: Blood. Central nervous system. Kidney. Liver. Respiratory tract.

Chronic Toxicity and Carcinogenicity
For the active ingredient(s): Did not cause cancer in laboratory animals. For the minor component(s): Has caused cancer in laboratory animals. However, the relevance of this to humans is unknown.

Carcinogenicity Classifications:

<table>
<thead>
<tr>
<th>Component</th>
<th>List</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexanone</td>
<td>ACGIH</td>
<td>Confirmed animal carcinogen with unknown relevance to humans.; Group A3</td>
</tr>
<tr>
<td>Cumene</td>
<td>IARC</td>
<td>Possibly carcinogenic to humans.; 2B</td>
</tr>
</tbody>
</table>

Developmental Toxicity
Clopyralid caused birth defects in test animals, but only at greatly exaggerated doses that were severely toxic to the mothers. No birth defects were observed in animals given clopyralid at doses several times greater than those expected during normal exposure. For the active ingredient(s): MCPA-2-ethylhexyl. Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Based on information for component(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Has caused birth defects in lab animals only at doses producing severe toxicity in the mother.
Reproductive Toxicity
Based on information for component(s): In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Cyclohexanone caused reduced growth and survival of offspring in an animal reproduction study. Dose levels producing this effect also caused central nervous system effects in parental animals. For the active ingredient(s): In animal studies, did not interfere with reproduction.

Genetic Toxicology
For the active ingredient(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative. Based on information for component(s): In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were inconclusive.

12. Ecological Information

Toxicity

Data for Component: 3,6-Dichloropicolinic Acid (Clopyralid)
Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested). Material is slightly toxic to birds on an acute basis (LD50 between 501 and 2000 mg/kg). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm).

Fish Acute & Prolonged Toxicity
LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 h: > 99.9 mg/l

Aquatic Invertebrate Acute Toxicity
EC50, Daphnia magna (Water flea), static test, 48 h: > 99 mg/l

Aquatic Plant Toxicity
ErC50, Pseudokirchneriella subcapitata (green algae), Growth rate inhibition, 96 h: 33.1 mg/l
EC50, Lemna gibba, 14 d: 89 mg/l

Toxicity to Micro-organisms
EC50; Bacteria: > 100 mg/l

Fish Chronic Toxicity Value (ChV)
Pimephales promelas (fathead minnow), 34 d, NOEC:10.8 mg/l

Aquatic Invertebrates Chronic Toxicity Value
Daphnia magna (Water flea), static test, 21 d, NOEC: 17 mg/l

Toxicity to Above Ground Organisms
oral LD50, Anas platyrhynchos (Mallard duck): 1465 mg/kg bodyweight.
dietary LC50, Anas platyrhynchos (Mallard duck): > 5000 mg/kg diet.
oral LD50, Apis mellifera (bees): > 100 micrograms/bee
contact LD50, Apis mellifera (bees): > 98.1 micrograms/bee

Toxicity to Soil Dwelling Organisms
LC50, Eisenia fetida (earthworms), 14 d: > 1,000 mg/kg

Data for Component: MCPA 2-EHE: 2-Methyl-4-Chlorophenoxyacetic Acid 2-Ethylhexyl Ester
Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm). Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg).

Fish Acute & Prolonged Toxicity
LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 h: > 0.50 mg/l

Aquatic Invertebrate Acute Toxicity
EC50, Daphnia magna (Water flea), 48 h: 0.29 mg/l

Aquatic Plant Toxicity
EyC50, Skeletonema costatum, Growth inhibition (cell density reduction), 96 h: 0.17 mg/l
EC50, Lemna minor (duckweed), 14 d: 0.13 mg/l

Toxicity to Above Ground Organisms
oral LD50, Colinus virginianus (Bobwhite quail): > 2250 mg/kg bodyweight.
dietary LC50, Colinus virginianus (Bobwhite quail): > 5620 mg/kg diet.
Data for Component: Cyclohexanone
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, Leuciscus idus (Golden orfe), static test, 48 h: 630 mg/l
LC50, Pimephales promelas (fathead minnow), static test, 96 h: 527 - 732 mg/l

Aquatic Invertebrate Acute Toxicity
EC50, Daphnia magna (Water flea), 24 h, immobilization: 820 mg/l

Toxicity to Micro-organisms
EC50, OECD 209 Test; activated sludge: > 1,000 mg/l

Data for Component: Solvent naphtha (petroleum), light aromatic consists of:

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested). Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm).

Fish Acute & Prolonged Toxicity
LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 h: 9.22 mg/l

Aquatic Invertebrate Acute Toxicity
EC50, Daphnia magna (Water flea), 48 h: 3.2 mg/l

Aquatic Plant Toxicity
For similar material(s): EC50, Pseudokirchneriella subcapitata (green algae), 72 h: 2.9 mg/l

Toxicity to Above Ground Organisms
dietary LC50, Colinus virginianus (Bobwhite quail): > 6500 mg/kg diet.
oral LD50, Colinus virginianus (Bobwhite quail): > 2150 mg/kg bodyweight.

Data for Component: 1,2,4-Trimethylbenzene

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, Pimephales promelas (fathead minnow), flow-through test, 96 h: 7.7 mg/l

Aquatic Invertebrate Acute Toxicity
EC50, Daphnia magna (Water flea), 48 h: 3.6 mg/l

Data for Component: 1,3,5-Trimethylbenzene

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, Carassius auratus (goldfish), flow-through test, 96 h: 12.5 mg/l

Aquatic Invertebrate Acute Toxicity
LC50, Daphnia magna (Water flea), static test, 48 h, mortality: 6 mg/l

Aquatic Plant Toxicity
EC50, alga Scenedesmus sp., biomass growth inhibition, 48 h: 25 mg/l

Aquatic Invertebrates Chronic Toxicity Value
Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, NOEC: 0.4 mg/l

Data for Component: Cumene

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 h: 2.7 mg/l

Aquatic Invertebrate Acute Toxicity
EC50, Daphnia magna (Water flea), static test, 48 h, immobilization: 4.0 mg/l

Aquatic Plant Toxicity
EC50, Pseudokirchneriella subcapitata (green algae), static test, biomass growth inhibition, 72 h: 2.6 mg/l

Aquatic Invertebrates Chronic Toxicity Value
Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, NOEC: 0.35 mg/l, LOEC: 0.66 mg/l
Toxicity to Above Ground Organisms
oral LD50, redwing blackbird (Agelaius phoeniceus): > 98 mg/kg

Data for Component: Xylene
Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, Oncorhynchus mykiss (rainbow trout), 96 h: 9.2 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, Daphnia magna (Water flea), 48 h, lethality: 14.3 mg/l
Aquatic Plant Toxicity
EbC50, Pseudokirchneriella subcapitata (green algae), biomass growth inhibition, 72 h: 3.2 - 4.9 mg/l

Persistence and Degradability

Data for Component: 3,6-Dichloropicolinic acid (Clopyralid)
Material is expected to biodegrade only very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.

Stability in Water (1/2-life):
; pH 4 - 9; Stable

OECD Biodegradation Tests:

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 10 %</td>
<td>28 d</td>
<td>OECD 301B Test</td>
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</tbody>
</table>

Indirect Photodegradation with OH Radicals

<table>
<thead>
<tr>
<th>Rate Constant</th>
<th>Atmospheric Half-life</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.481E-13 cm3/s</td>
<td>19.5 d</td>
<td>Measured</td>
</tr>
</tbody>
</table>

Biological oxygen demand (BOD):
<table>
<thead>
<tr>
<th>BOD 5</th>
<th>BOD 10</th>
<th>BOD 20</th>
<th>BOD 28</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 %</td>
</tr>
</tbody>
</table>

Chemical Oxygen Demand: 0.73 mg/mg
Theoretical Oxygen Demand: 0.71 mg/mg

Data for Component: MCPA 2-EHE: 2-Methyl-4-Chlorophenoxyacetic Acid 2-Ethylhexyl Ester
No relevant information found.

Stability in Water (1/2-life):
76 d; 25 °C; pH 7; Measured

Data for Component: Cyclohexanone
Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

OECD Biodegradation Tests:

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>87 %</td>
<td>14 d</td>
<td>OECD 301C Test</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Indirect Photodegradation with OH Radicals

<table>
<thead>
<tr>
<th>Rate Constant</th>
<th>Atmospheric Half-life</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.21E-11 cm3/s</td>
<td>10.6 h</td>
<td>Estimated.</td>
</tr>
</tbody>
</table>

Theoretical Oxygen Demand: 2.61 mg/g

Data for Component: Solvent naphtha (petroleum), light aromatic consists of:
For the major component(s): Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%). For some component(s): Biodegradation under aerobic static laboratory conditions is low (BOD20 or BOD28/ThOD between 2.5 and 10%).

Data for Component: 1,2,4-Trimethylbenzene
Material is expected to biodegrade only very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.

OECD Biodegradation Tests:

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 18 %</td>
<td>28 d</td>
<td>OECD 301C Test</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Indirect Photodegradation with OH Radicals
Rate Constant | Atmospheric Half-life | Method
--- | --- | ---
1.670E-11 cm³/s | 0.641 d | Estimated.

Theoretical Oxygen Demand: 3.19 mg/mg

Data for Component: 1,3,5-Trimethylbenzene
Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

OECD Biodegradation Tests:

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 %</td>
<td>28 d</td>
<td>OECD 301C Test</td>
<td>Not applicable</td>
</tr>
<tr>
<td>50 %</td>
<td>4.4 d</td>
<td>Calculated</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Indirect Photodegradation with OH Radicals
Rate Constant | Atmospheric Half-life | Method
--- | --- | ---
3.51E-11 cm³/s | 3.7 h | Estimated.

Theoretical Oxygen Demand: 3.19 mg/mg

Data for Component: Cumene
Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

OECD Biodegradation Tests:

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>86 %</td>
<td>28 d</td>
<td>OECD 301D Test</td>
<td>pass</td>
</tr>
</tbody>
</table>

Indirect Photodegradation with OH Radicals
Rate Constant | Atmospheric Half-life | Method
--- | --- | ---
6.90E-12 cm³/s | 1.55 d | Estimated.

Biological oxygen demand (BOD):

<table>
<thead>
<tr>
<th>BOD 5</th>
<th>BOD 10</th>
<th>BOD 20</th>
<th>BOD 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.000 %</td>
<td>62.000 %</td>
<td>70.000 %</td>
<td></td>
</tr>
</tbody>
</table>

Theoretical Oxygen Demand: 3.20 mg/mg

Data for Component: Xylene
Material is expected to be readily biodegradable.

Indirect Photodegradation with OH Radicals
Rate Constant | Atmospheric Half-life | Method
--- | --- | ---
6.5E-12 cm³/s | 19.7 h | Estimated.

Biological oxygen demand (BOD):

<table>
<thead>
<tr>
<th>BOD 5</th>
<th>BOD 10</th>
<th>BOD 20</th>
<th>BOD 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>37.000 %</td>
<td>58.000 %</td>
<td>72.000 %</td>
<td></td>
</tr>
</tbody>
</table>

Theoretical Oxygen Demand: 3.17 mg/mg

Bioaccumulative potential

Data for Component: 3,6-Dichloropicolinic acid (Clopyralid)

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient, n-octanol/water (log Pow): -2.63
Bioconcentration Factor (BCF): < 1; Fish; Measured

Data for Component: MCPA 2-EHE: 2-Methyl-4-Chlorophenoxyacetic Acid 2-Ethylhexyl Ester

Bioaccumulation: Bioconcentration potential is high (BCF > 3000 or Log Pow between 5 and 7).
Bioconcentration Factor (BCF): 11,250

Data for Component: Cyclohexanone

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient, n-octanol/water (log Pow): 0.81 Measured

Data for Component: Solvent naphtha (petroleum), light aromatic consists of:

Bioaccumulation: For the major component(s): Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5). For the minor component(s): Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
**Bioaccumulation:** Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

**Partition coefficient, n-octanol/water (log Pow):** 3.63 Measured

**Bioconcentration Factor (BCF):** 33 - 275; Cyprinus carpio (Carp); Measured

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

**Partition coefficient, n-octanol/water (log Pow):** 3.42 Measured

**Bioconcentration Factor (BCF):** 161; Pimephales promelas (fathead minnow); Measured

**Mobility in soil**

**Data for Component: 1,2,4-Trimethylbenzene**

- **Mobility in soil:** Potential for mobility in soil is very high (Koc between 0 and 50).
- **Partition coefficient, soil organic carbon/water (Koc):** 4.9
- **Henry’s Law Constant (H):** 4.92E-09 atm*m3/mole; 25 °C Estimated.

**Data for Component: 1,3,5-Trimethylbenzene**

- **Mobility in soil:** Expected to be relatively immobile in soil (Koc > 5000).
- **Partition coefficient, soil organic carbon/water (Koc):** 10,500 Estimated.
- **Henry’s Law Constant (H):** 6.253E-05 atm*m3/mole; 25 °C Estimated.

**Data for Component: Cumene**

- **Mobility in soil:** Potential for mobility in soil is very high (Koc between 0 and 50).
- **Partition coefficient, soil organic carbon/water (Koc):** 720 Estimated.
- **Henry’s Law Constant (H):** 6.16E-03 atm*m3/mole; 25 °C Measured

**Data for Component: Xylene**

- **Mobility in soil:** Potential for mobility in soil is low (Koc between 500 and 2000).
- **Partition coefficient, soil organic carbon/water (Koc):** 443 Estimated.
- **Henry’s Law Constant (H):** 7.45E-03 atm*m3/mole; 25 °C Estimated.
13. Disposal Considerations

If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

14. Transport Information

TDG Small container
TDG not required for road or rail per Sec. 1.33

TDG Large container
Proper Shipping Name: FLAMMABLE LIQUID, N.O.S.
Technical Name: Solvent naphtha (petroleum), light aromatic, CYCLOHEXANONE
Hazard Class: 3  ID Number: UN1993  Packing Group: PG III

IMDG
Proper Shipping Name: FLAMMABLE LIQUID, N.O.S.
Technical Name: Solvent naphtha (petroleum), light aromatic, CYCLOHEXANONE
Hazard Class: 3  ID Number: UN1993  Packing Group: PG III
EMS Number: F-E,S-E
Marine pollutant: Yes

ICAO/IATA
Proper Shipping Name: FLAMMABLE LIQUID, N.O.S.
Technical Name: Solvent naphtha (petroleum), light aromatic, CYCLOHEXANONE
Hazard Class: 3  ID Number: UN1993  Packing Group: PG III
Cargo Packing Instruction: 366
Passenger Packing Instruction: 355

15. Regulatory Information

CEPA - Domestic Substances List (DSL)
All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

Hazardous Products Act Information: CPR Compliance
This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Hazardous Products Act Information: WHMIS Classification
This product is exempt under WHMIS.

Pest Control Products Act Registration number: 27032

National Fire Code of Canada
Class II
16. Other Information

Hazard Rating System
NFPA  Health  Fire  Reactivity
1  2  0

Recommended Uses and Restrictions

Identified uses
Product use: End use herbicide product

Revision
Identification Number: 50405 / 1023 / Issue Date 2014.01.13 / Version: 8.4
DAS Code: XRM-5171
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Not available</td>
</tr>
<tr>
<td>W/W</td>
<td>Weight/Weight</td>
</tr>
<tr>
<td>OEL</td>
<td>Occupational Exposure Limit</td>
</tr>
<tr>
<td>STEL</td>
<td>Short Term Exposure Limit</td>
</tr>
<tr>
<td>TWA</td>
<td>Time Weighted Average</td>
</tr>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists, Inc.</td>
</tr>
<tr>
<td>DOW IHG</td>
<td>Dow Industrial Hygiene Guideline</td>
</tr>
<tr>
<td>WEEL</td>
<td>Workplace Environmental Exposure Level</td>
</tr>
<tr>
<td>HAZ DES</td>
<td>Hazard Designation</td>
</tr>
<tr>
<td>VOL/VOL</td>
<td>Volume/Volume</td>
</tr>
</tbody>
</table>

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