MATERIAL SAFETY DATA SHEETS

FOR ALTITUDE FX2:

AC 299,263 120 AS HERBICIDE SOLUTION

PLUS

STARANE HERBICIDE
Safety Data Sheet
AC 299.263 120AS

1. Product and Company Identification

Company
BASF Canada Inc.
100 Milverton Drive
Mississauga, ON L5R 4H1
CANADA

24 Hour Emergency Response Information
CANUTEC (reverse charges): (613) 996-6666
BASF HOTLINE: (800) 454-COPE (2673)

Molecular formula: C15 H18 N3 O4 . N H(4)
PCP # 26705
Synonyms: ammonium salt of imazamox

2. Hazards Identification

Emergency overview
Contains 1,2-benzisothiazolin-3-one as a preservative.
KEEP OUT OF REACH OF CHILDREN.
HARMFUL IF ABSORBED THROUGH SKIN.
HARMFUL IF INHALED.
Avoid inhalation of mists/vapours.
Avoid contact with the skin, eyes and clothing.

State of matter: liquid
Colour: pale yellow, clear
Odour: acidic, mild

Potential health effects

Acute toxicity:
Relatively nontoxic after single ingestion. Slightly toxic after short-term skin contact. Relatively nontoxic after short-term inhalation.

Irritation / corrosion:
Not irritating to eyes and skin.

Sensitization:
There is no evidence of a skin-sensitizing potential.

Chronic toxicity:
Repeated dose toxicity: The product has not been tested. The statement has been derived from the properties of the individual components. No substance-specific organotoxicity was observed after repeated administration to animals.
Reproductive toxicity: The product has not been tested. The statement has been derived from the properties of the individual components. The results of animal studies gave no indication of a fertility impairing effect.

Teratogenicity: The product has not been tested. The statement has been derived from the properties of the individual components. Animal studies gave no indication of a developmental toxic effect at doses that were not toxic to the parental animals.

Genotoxicity: The product has not been tested. The statement has been derived from the properties of the individual components. Mutagenicity tests revealed no genotoxic potential.

Signs and symptoms of overexposure: No significant reaction of the human body to the product known.

Potential environmental effects

Aquatic toxicity: There is a high probability that the product is not acutely harmful to aquatic organisms.

Terrestrial toxicity: With high probability not acutely harmful to terrestrial organisms.

Degradation / environmental fate: The product has not been tested. The statement has been derived from the properties of the individual components.

Bioaccumulation / bioconcentration: The product has not been tested. The statement has been derived from the properties of the individual components.

3. Composition / Information on Ingredients

Not WHMIS controlled.

4. First-Aid Measures

General advice:
First aid providers should wear personal protective equipment to prevent exposure. Remove contaminated clothing. Move person to fresh air. If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or physician for treatment advice. Have the product container or label with you when calling a poison control center or doctor or going for treatment.

If inhaled:
Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary.

If on skin:
Rinse skin immediately with plenty of water for 15 - 20 minutes.

If in eyes:
Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing.

If swallowed:
Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.
5. Fire-Fighting Measures

Flash point: A flash point determination is unnecessary due to the high water content.
Autoignition: Based on the water content the product does not ignite.
Lower explosion limit: As a result of our experience with this product and our knowledge of its composition we do not expect any hazard as long as the product is used appropriately and in accordance with the intended use.
Upper explosion limit: As a result of our experience with this product and our knowledge of its composition we do not expect any hazard as long as the product is used appropriately and in accordance with the intended use.

Flammability: Based on the structure or composition there is no indication of flammability

Suitable extinguishing media: foam, dry powder, carbon dioxide, water spray

Hazards during fire-fighting: carbon monoxide, carbon dioxide, nitrogen oxide, nitrogen dioxide, Ammonium, Hydrocarbons, If product is heated above decomposition temperature, toxic vapours will be released. The substances/groups of substances mentioned can be released in case of fire.

Protective equipment for fire-fighting: Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

6. Accidental release measures

Personal precautions: Take appropriate protective measures. Clear area. Shut off source of leak only under safe conditions. Extinguish sources of ignition nearby and downwind. Ensure adequate ventilation. Wear suitable personal protective clothing and equipment.

Environmental precautions: Do not discharge into the subsoil/soil. Do not discharge into drains/surface waters/groundwater. Contain contaminated water/ firefighting water.

Cleanup: Dike spillage. Pick up with suitable absorbent material. Place into suitable containers for reuse or disposal in a licensed facility. Spilled substance/product should be recovered and applied according to label rates whenever possible. If application of spilled substance/product is not possible, then spills should be contained, solidified, and placed in suitable containers for disposal. After decontamination, spill area can be washed with water. Collect wash water for approved disposal.
7. Handling and Storage

Handling

General advice:
Ensure adequate ventilation. Keep away from sources of ignition - No smoking. Keep container tightly sealed. Protect contents from the effects of light. Protect against heat. Protect from air. Handle and open container with care. Do not open until ready to use. Avoid aerosol formation. Avoid dust formation. Provide means for controlling leaks and spills. Do not return residues to the storage containers. Follow label warnings even after container is emptied. The substance/product may be handled only by appropriately trained personnel. Avoid contact with the skin, eyes and clothing. Avoid inhalation of dusts/mists/vapours. Wear suitable personal protective clothing and equipment.

Protection against fire and explosion:
The relevant fire protection measures should be noted. Fire extinguishers should be kept handy. Avoid all sources of ignition: heat, sparks, open flame. Sources of ignition should be kept well clear. Avoid extreme heat. Keep away from oxidizable substances. Electrical equipment should conform to national electric code. Ground all transfer equipment properly to prevent electrostatic discharge. Electrostatic discharge may cause ignition.

Storage

General advice:
Keep only in the original container in a cool, dry, well-ventilated place away from ignition sources, heat or flame. Protect containers from physical damage. Protect against contamination. The authority permits and storage regulations must be observed.

Storage incompatibility:
General advice: Segregate from incompatible substances. Segregate from foods and animal feeds. Segregate from textiles and similar materials.

Storage stability:
If substance/product crystallizes, thaw at room temperature.

Temperature tolerance
Protect from temperatures below: 0 °C
Changes in the properties of the product may occur if substance/product is stored below indicated temperature for extended periods of time.
Protect from temperatures above: 40 °C
Changes in the properties of the product may occur if substance/product is stored above indicated temperature for extended periods of time.

8. Exposure Controls and Personal Protection

Users of a pesticidal product should refer to the product label for personal protective equipment requirements.

Advice on system design:
Whenever possible, engineering controls should be used to minimize the need for personal protective equipment.

Personal protective equipment

Respiratory protection:
Wear respiratory protection if ventilation is inadequate. Wear a NIOSH-certified (or equivalent) TC23C Chemical/Mechanical type filter system to remove a combination of particles, gas and vapours.

Hand protection:
Chemical resistant protective gloves, Protective glove selection must be based on the user's assessment of the workplace hazards.
Eye protection:
Safety glasses with side-shields. Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

9. Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>acidic, mild</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Colour</td>
<td>pale yellow, clear</td>
</tr>
<tr>
<td>pH value</td>
<td>approx. 5 - 7 (20 °C)</td>
</tr>
<tr>
<td>Freezing point</td>
<td>approx. 0 °C (1,013.3 hPa) Information applies to the solvent.</td>
</tr>
<tr>
<td>Boiling point</td>
<td>approx. 100 °C (1,013.3 hPa) Information applies to the solvent.</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>approx. 23.3 hPa (20 °C) Information applies to the solvent.</td>
</tr>
<tr>
<td>Density</td>
<td>1.0486 g/cm³ (20 °C)</td>
</tr>
<tr>
<td>Vapour density</td>
<td>not applicable</td>
</tr>
<tr>
<td>Partitioning coefficient n-octanol/water (log Pow)</td>
<td>not applicable</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>3.7 mPa.s (20 °C)</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>soluble</td>
</tr>
<tr>
<td>Other Information</td>
<td>If necessary, information on other physical and chemical parameters is indicated in this section.</td>
</tr>
</tbody>
</table>

10. Stability and Reactivity

Conditions to avoid:

Substances to avoid:
oxidizing agents

Hazardous reactions:
The product is chemically stable.
No hazardous reactions if stored and handled as prescribed/indicated.

Decomposition products:
Hazardous decomposition products: No hazardous decomposition products if stored and handled as prescribed/indicated.

Thermal decomposition:
Possible thermal decomposition products:
carbon monoxide, carbon dioxide, nitrogen oxide, nitrogen dioxide, Ammonium, Hydrocarbons
Stable at ambient temperature. If product is heated above decomposition temperature toxic vapours may be released. If product is heated above decomposition temperature hazardous fumes may be released.

Corrosion to metals:
Corrosive effects to metal are not anticipated.

Oxidizing properties:
not fire-propagating
11. Toxicological information

Acute toxicity

Oral:
Type of value: LD50
Species: rat
Value: > 5,000 mg/kg

Inhalation:
Type of value: LC50
Species: rat
Value: > 5 mg/l
Exposure time: 4 h

Dermal:
Type of value: LD50
Species: rat
Value: > 4,000 mg/kg

Irritation / corrosion

Skin:
Species: rabbit
Result: non-irritant

Eye:
Species: rabbit
Result: non-irritant

Sensitization:
modified Buehler test
Species: guinea pig
Result: Skin sensitizing effects were not observed in animal studies.

Other Information:
Misuse can be harmful to health.

12. Ecological Information

Fish

Information on: imazamox
Acute:
*Lepomis macrochirus/LC50 (96 h):* > 119 mg/l

Aquatic invertebrates

Acute:
OECD Guideline 202, part 1 static
*Daphnia magna/EC50 (48 h):* > 100 mg/l

Information on: imazamox
Acute:
*Daphnia magna/EC50 (48 h):* > 100 mg/l

Aquatic plants

Toxicity to aquatic plants:
OECD Guideline 201 static
green algae/EC50 (72 h): > 100 mg/l

Information on: imazamox
Toxicity to aquatic plants:
green algae/EC50 (72 h): 29.1 mg/l
swollen duckweed/EC50 (7 d): 0.031 mg/l

Environmental mobility:

Assessment transport between environmental compartments:
The substance will not evaporate into the atmosphere from the water surface.
Following exposure to soil, the product trickles away and can - dependant on degradation - be transported to deeper soil areas with larger water loads.

13. Disposal considerations

Waste disposal of substance:
See product label for disposal and recycling instructions.

Container disposal:
Contaminated packaging should be emptied as far as possible and disposed of in the same manner as the substance/product.

14. Transport Information

Land transport
TDG
Not classified as a dangerous good under transport regulations

Sea transport
IMDG
Not classified as a dangerous good under transport regulations

Air transport
IATA/ICAO
Not classified as a dangerous good under transport regulations

15. Regulatory Information

Federal Regulations

Registration status:
Crop Protection DSL, CA released / exempt
Chemical DSL, CA released; restriction on quantity / not listed
WHMIS does not apply to this product.

THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CPR AND THE MSDS CONTAINS ALL THE INFORMATION REQUIRED BY THE CPR.

16. Other Information

Recommended use: herbicide

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

SDS Prepared by:
BASF NA Product Regulations

BASF HOTLINE (800) 454 – COPE (2673)
SDS Prepared on: 2015/01/12

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END OF DATA SHEET
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
Starane* 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 2012.06.18
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: Brown
Physical State: Liquid
Odor: Odorless

Hazard of product:

Potential Health Effects
Eye Contact: May cause moderate eye irritation which may be slow to heal. May cause slight corneal injury. Vapor may cause eye irritation experienced as mild discomfort and redness.
Skin Contact: Brief contact may cause slight skin irritation with local redness.
Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.
Inhalation: No adverse effects are anticipated from single exposure to mist. Excessive exposure to solvent(s) may cause respiratory irritation and central nervous system depression.
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 the solvent(s): Excessive exposure to solvent(s) may cause respiratory irritation and central nervous system depression. For the minor component(s): In animals, effects have been reported on the following organs: Liver. Kidney. Blood-forming organs (Bone marrow & Spleen). Blood. Respiratory tract.
Cancer Information: For the minor component(s) Naphthalene. Has caused cancer in some laboratory animals. In humans, there is limited evidence of cancer in workers involved in naphthalene production. Limited oral studies in rats were negative.
Birth Defects/Developmental Effects: For the active ingredient(s): Fluroxypyr 1-methylheptyl ester. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. For the minor component(s): Has been toxic to the fetus in lab animals at doses nontoxic to the mother. Has caused birth defects in laboratory animals only at doses toxic to the mother.
Reproductive Effects: For the minor component(s): In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent 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>Fluroxypyr 1-methylheptyl ester</td>
<td>81406-37-3</td>
<td>(26.2)%</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>&lt;= 6.0 %</td>
</tr>
<tr>
<td>N-Methyl-2-pyrroldone</td>
<td>872-50-4</td>
<td>5.1 %</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>95-63-6</td>
<td>&lt;= 3.4 %</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), light aromatic</td>
<td>64742-95-6</td>
<td>0.7 %</td>
</tr>
<tr>
<td>Balance</td>
<td>Not available</td>
<td>58.6 %</td>
</tr>
</tbody>
</table>

Amounts are presented as percentages by weight.

4. First-aid measures

Description of first aid measures
Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.
Skin Contact: Wash skin with plenty of water.
Eye Contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist.
Ingestion: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.
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), no additional symptoms and effects are anticipated.
Indication of immediate medical attention and special treatment needed
Maintain adequate ventilation and oxygenation of the patient. The decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

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: Nitrogen oxides. 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.

Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. 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. 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). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

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. Refer to Section 7, Handling, for additional precautionary measures. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. 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:** Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Do not swallow. Avoid breathing vapor. Use with adequate ventilation. Keep container closed. 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. Keep away from heat, sparks and flame. Keep out of reach of children. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION. Handling operations that can promote accumulation of static charges include but are not limited to mixing, filtering, pumping at high flow rates, splash filling, creating mists or sprays, tank and container filling, tank cleaning, sampling, gauging, switch loading, vacuum truck operations.

Storage

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

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>Fluroxypyr 1-methylheptyl ester</td>
<td>Dow IHG</td>
<td>TWA</td>
<td>10 mg/m3</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>CAD AB OEL</td>
<td>TWA</td>
<td>52 mg/m3</td>
</tr>
<tr>
<td></td>
<td>CAD AB OEL</td>
<td>STEL</td>
<td>79 mg/m3</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>TWA</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>STEL</td>
<td>15 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD ON OEL</td>
<td>TWA</td>
<td>52 mg/m3</td>
</tr>
<tr>
<td></td>
<td>CAD ON OEL</td>
<td>STEV</td>
<td>78 mg/m3</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>TWA</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>STEL</td>
<td>15 ppm</td>
</tr>
<tr>
<td></td>
<td>OEL (QUE)</td>
<td>TWA</td>
<td>52 mg/m3</td>
</tr>
<tr>
<td></td>
<td>OEL (QUE)</td>
<td>STEL</td>
<td>79 mg/m3</td>
</tr>
<tr>
<td>N-Methyl-2-pyrrolidone</td>
<td>CAD ON OEL</td>
<td>TWA</td>
<td>400 mg/m3</td>
</tr>
<tr>
<td></td>
<td>AIHA WEEL</td>
<td>TWA</td>
<td>40 mg/m3</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>CAD AB OEL</td>
<td>TWA</td>
<td>123 mg/m3</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>TWA</td>
<td>123 mg/m3</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</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: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Hand protection: Use gloves chemically resistant to this material. 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: Neoprene. 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, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. 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 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>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Brown</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Odorless</td>
</tr>
<tr>
<td>pH</td>
<td>5.5 Literature 1% aqueous solution.</td>
</tr>
<tr>
<td>Melting Point</td>
<td>No test data available</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>-10 °C Literature</td>
</tr>
<tr>
<td>Boiling Point (760 mmHg)</td>
<td>202 °C Literature</td>
</tr>
<tr>
<td>Flash Point - Closed Cup</td>
<td>63 °C Closed Cup</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No test data available</td>
</tr>
<tr>
<td>(Butyl Acetate = 1)</td>
<td></td>
</tr>
<tr>
<td>Flammable Limits In Air</td>
<td>Lower: No test data available</td>
</tr>
<tr>
<td></td>
<td>Upper: No test data available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>No test data available</td>
</tr>
<tr>
<td>Vapor Density (air = 1)</td>
<td>No test data available</td>
</tr>
<tr>
<td>Specific Gravity (H2O = 1)</td>
<td>No test data available</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>No test data available</td>
</tr>
<tr>
<td>(by weight)</td>
<td></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>Kinematic Viscosity</td>
<td>No test data available</td>
</tr>
<tr>
<td>Liquid Density</td>
<td>0.99 g/cm3 @ 25 °C Calculated</td>
</tr>
</tbody>
</table>
10. Stability and Reactivity

Reactivity
No dangerous reaction known under conditions of normal use.

Chemical stability
Unstable at elevated temperatures.

Possibility of hazardous reactions
Polymerization will not occur.

Conditions to Avoid: Active ingredient decomposes at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.


Hazardous decomposition products
Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Carbon monoxide. Carbon dioxide. Hydrogen chloride. Hydrogen fluoride. Nitrogen oxides. Toxic gases are released during decomposition.

11. Toxicological Information

Acute Toxicity
Ingestion
LD50, rat, male  3,738 mg/kg
LD50, rat, female  3,162 mg/kg

Dermal
LD50, rabbit > 2,000 mg/kg

Inhalation
LC50, 4 h, Aerosol, rat, male and female > 6.2 mg/l

Eye damage/eye irritation
May cause moderate eye irritation which may be slow to heal. May cause slight corneal injury. Vapor may cause eye irritation experienced as mild discomfort and redness.

Skin corrosion/irritation
Brief contact may cause slight skin irritation with local redness.

Sensitization
Skin
Did not cause allergic skin reactions when tested in guinea pigs.

Repeated Dose Toxicity
For the active ingredient(s): Based on available data, repeated exposures are not anticipated to cause significant adverse effects. For the solvent(s): Excessive exposure to solvent(s) may cause respiratory irritation and central nervous system depression. For the minor component(s): In animals, effects have been reported on the following organs: Liver. Kidney. Blood-forming organs (Bone marrow & Spleen). Blood. Respiratory tract.

Chronic Toxicity and Carcinogenicity
Active ingredient did not cause cancer in laboratory animals. For the minor component(s)
Naphthalene. Has caused cancer in some laboratory animals. In humans, there is limited evidence of cancer in workers involved in naphthalene production. Limited oral studies in rats were negative.

Carcinogenicity Classifications:

<table>
<thead>
<tr>
<th>Component</th>
<th>List</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>IARC</td>
<td>Possibly carcinogenic to humans.; 2B</td>
</tr>
</tbody>
</table>

Developmental Toxicity
For the active ingredient(s): Fluroxypyr 1-methylheptyl ester. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. For the minor component(s): Has been toxic to the fetus in lab animals at doses nontoxic to the mother. Has caused birth defects in laboratory animals only at doses toxic to the mother. For the active ingredient(s): Fluroxypyr 1-methylheptyl ester. Did not cause birth defects in laboratory animals.
Reproductive Toxicity
In animal studies, active ingredient did not interfere with reproduction. For the minor component(s): In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

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

12. Ecological Information

Toxicity
Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg).

Toxicity to Above Ground Organisms
oral LD50, Colinus virginianus (Bobwhite quail): > 2250 mg/kg diet.

Persistence and Degradability

Data for Component: Fluroxypyr 1-methylheptyl ester
Material is not readily biodegradable according to OECD/EEC guidelines.
Stability in Water (1/2-life):
454 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></td>
<td>32 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Theoretical Oxygen Demand: 2.2 mg/g

Data for Component: Naphthalene
Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%).
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>2.16E-11 cm3/s</td>
<td>5.9 h</td>
<td>Estimated.</td>
</tr>
</tbody>
</table>

Biological oxygen demand (BOD):
- BOD 5: 57.000 %
- BOD 10: 71.000 %
- BOD 20: 71.000 %
- BOD 28: 71.000 %

Theoretical Oxygen Demand: 3.00 mg/mg

Data for Component: N-Methyl-2-pyrrolidone
Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches >70% biodegradation in OECD test(s) for inherent 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></td>
<td>91 %</td>
<td>28 d</td>
<td>OECD 301B Test</td>
</tr>
<tr>
<td></td>
<td>&gt; 90 %</td>
<td>8 d</td>
<td>OECD 302B Test</td>
</tr>
<tr>
<td></td>
<td>73 %</td>
<td>28 d</td>
<td>OECD 301C Test</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>2.199E-11 cm3/s</td>
<td>0.486 d</td>
<td>Estimated.</td>
</tr>
</tbody>
</table>

Theoretical Oxygen Demand: 2.58 mg/mg

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

<table>
<thead>
<tr>
<th>Rate Constant</th>
<th>Atmospheric Half-life</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.670E-11 cm³/s</td>
<td>0.641 d</td>
<td>Estimated.</td>
</tr>
</tbody>
</table>

Theoretical Oxygen Demand: 3.19 mg/mg

Data for Component: Solvent naphtha (petroleum), light aromatic
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%).

Bioaccumulative potential

**Data for Component: Fluroxypyr 1-methylheptyl ester**
- **Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
- **Partition coefficient, n-octanol/water (log Pow):** 5.04 Measured
- **Bioconcentration Factor (BCF):** 26; Oncorhynchus mykiss (rainbow trout); Measured

**Data for Component: Naphthalene**
- **Bioaccumulation:** Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
- **Partition coefficient, n-octanol/water (log Pow):** 3.3 Measured
- **Bioconcentration Factor (BCF):** 40 - 300; Fish; Measured

**Data for Component: N-Methyl-2-pyrrolidone**
- **Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
- **Partition coefficient, n-octanol/water (log Pow):** -0.38 Measured

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

**Data for Component: Solvent naphtha (petroleum), light aromatic**
- **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).

Mobility in soil

**Data for Component: Fluroxypyr 1-methylheptyl ester**
- **Mobility in soil:** Expected to be relatively immobile in soil (Koc > 5000).
- **Partition coefficient, soil organic carbon/water (Koc):** 6,200 - 43,000
- **Henry’s Law Constant (H):** 5.42E-08 atm*m³/mole; 25 °C Measured

**Data for Component: Naphthalene**
- **Mobility in soil:** Potential for mobility in soil is medium (Koc between 150 and 500).
- **Partition coefficient, soil organic carbon/water (Koc):** 240 - 1,300
- **Henry’s Law Constant (H):** 2.92E-04 - 5.53E-04 atm*m³/mole; 25 °C Measured

**Distribution in Environment: Mackay Level 1 Fugacity Model:**

<table>
<thead>
<tr>
<th>Air</th>
<th>Water</th>
<th>Biota</th>
<th>Soil</th>
<th>Sediment</th>
</tr>
</thead>
<tbody>
<tr>
<td>74 %</td>
<td>8.5 %</td>
<td>&lt; 0.01 %</td>
<td>18 %</td>
<td>0.39 %</td>
</tr>
</tbody>
</table>

**Data for Component: N-Methyl-2-pyrrolidone**
- **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):** 21 Estimated
- **Henry’s Law Constant (H):** 4.46E-08 atm*m³/mole; 25 °C Measured

**Data for Component: 1,2,4-Trimethylbenzene**
- **Mobility in soil:** Potential for mobility in soil is low (Koc between 500 and 2000).
- **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: Solvent naphtha (petroleum), light aromatic

Mobility in soil: For the major component(s), Potential for mobility in soil is low (Koc between 500 and 2000).

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: Solvent naphtha (petroleum), light arom., Fluroxypyr 1-methylheptyl ester
Hazard Class: 9  ID Number: UN3082  Packing Group: PG III
EMS Number: F-A,S-F
Marine pollutant: No

ICAO/IATA
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name: CONTAINS NAPHTHALENE, Solvent naphtha (petroleum), light arom.
Hazard Class: 9  ID Number: UN3082  Packing Group: PG III
Cargo Packing Instruction: 964
Passenger Packing Instruction: 964

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: 24815

National Fire Code of Canada
Class IIIA
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>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Recommended Uses and Restrictions

Identified uses

Product use: End use herbicide product

Revision

Identification Number: 51231 / 1023 / Issue Date 2012.06.18 / Version: 6.3
DAS Code: XRM-5316
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

<table>
<thead>
<tr>
<th>Abbreviation</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>
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<tr>
<td>WEEL</td>
<td>Workplace Environmental Exposure Level</td>
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<tr>
<td>HAZ DES</td>
<td>Hazard Designation</td>
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<tr>
<td>VOL/VOL</td>
<td>Volume/Volume</td>
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</table>

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