

**Product Name:** STARANE (TM) Flex Herbicide**Issue Date:** 09/30/2013**Print Date:** 30 Sep 2013

Dow AgroSciences LLC 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™ Flex Herbicide

**COMPANY IDENTIFICATION**

Dow AgroSciences LLC  
A Subsidiary of The Dow Chemical Company  
9330 Zionsville Road  
Indianapolis, IN 46268-1189  
United States

Customer Information Number:

800-992-5994

[SDSQuestion@dow.com](mailto:SDSQuestion@dow.com)**EMERGENCY TELEPHONE NUMBER****24-Hour Emergency Contact:**

800-992-5994

**Local Emergency Contact:**

352-323-3500

## 2. Hazards Identification

**Emergency Overview****Color:** White**Physical State:** Liquid.**Odor:** Gasoline-like**Hazards of product:**

**WARNING!** Combustible liquid and vapor. Causes eye irritation. May cause allergic skin reaction. May cause anesthetic effects. May cause respiratory tract irritation. 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. Eliminate ignition sources. 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.

**OSHA Hazard Communication Standard**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**Potential Health Effects**

**Eye Contact:** May cause moderate eye irritation which may be slow to heal. May cause slight corneal injury.

**Skin Contact:** Brief contact may cause slight skin irritation with local redness. May cause drying and flaking of the skin. Effects may be slow to heal.

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

**Skin Sensitization:** Has demonstrated the potential for contact allergy in mice.

**Inhalation:** Prolonged exposure is not expected to cause adverse effects. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed.

**Ingestion:** Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

**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 active ingredient(s): Florasulam. In animals, effects have been reported on the following organs: Kidney. For the solvent(s): In animals, effects have been reported on the following organs: Liver. Kidney. Respiratory tract. Blood. Eye. Lung.

**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:** 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 solvent(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:** For the solvent(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

Component	CAS #	Amount
Florasulam	145701-23-1	0.5 %
Fluroxypyr 1-methylheptyl ester	81406-37-3	14.45 %
Solvent naphtha (petroleum), light aromatic	64742-95-6	31.0 %
1,2,4-Trimethylbenzene	95-63-6	9.3 %
Propylene glycol	57-55-6	3.4 %
1,3,5-Trimethylbenzene	108-67-8	2.5 %
Cumene	98-82-8	1.2 %
Xylene	1330-20-7	0.3 %
Balance	Not available	37.35 %

### 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. Wash skin with soap and plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Wash clothing before reuse. Shoes and other leather items which cannot be decontaminated should be disposed of properly. Suitable emergency safety shower facility should be available in work area.

**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), no additional symptoms and effects are anticipated.

#### **Indication of immediate medical attention and special treatment needed**

Maintain adequate ventilation and oxygenation of the patient. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. 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. 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.

|| Skin contact may aggravate preexisting dermatitis. Repeated excessive exposure may aggravate preexisting lung disease.

## **5. Fire Fighting Measures**

#### **Suitable extinguishing media**

To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. General purpose synthetic foams (including AFFF type) or protein foams are preferred if available. Alcohol resistant foams (ATC type) may function.

#### **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:** This material will not burn until the water has evaporated. Residue can burn. May produce flash fire. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. If exposed to fire from another source and water is evaporated, exposure to high temperatures may cause toxic fumes. 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. Eliminate ignition sources. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. 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.

## 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. Ground and bond all containers and handling equipment. 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. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. No smoking, open flames or sources of ignition in handling and storage area. Electrically ground and bond all equipment. 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. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. 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

Component	List	Type	Value
Fluroxypyr 1-methylheptyl ester	Dow IHG	TWA	10 mg/m <sup>3</sup>
1,2,4-Trimethylbenzene	ACGIH	TWA	25 ppm
Propylene glycol	WEEL	TWA Aerosol.	10 mg/m <sup>3</sup>
1,3,5-Trimethylbenzene	ACGIH	TWA	25 ppm
Cumene	ACGIH	TWA	50 ppm

	OSHA Table Z-1	PEL	245 mg/m3 50 ppm SKIN
Xylene	ACGIH	TWA	100 ppm BEI
	ACGIH	STEL	150 ppm BEI
	OSHA Table Z-1	PEL	435 mg/m3 100 ppm

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 BEI notation following the exposure guideline refers to a guidance value for assessing biological monitoring results as an indicator of the uptake of a substance from all routes of exposures.

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.

**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"). Styrene/butadiene rubber. Viton. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). Chlorinated polyethylene. Neoprene. 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:** 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

### Appearance

<b>Physical State</b>	Liquid.
<b>Color</b>	White
<b>Odor</b>	Gasoline-like
<b>pH</b>	4.5 (@ 1 %) <i>pH Electrode</i>
<b>Melting Point</b>	Not applicable
<b>Freezing Point</b>	No test data available
<b>Boiling Point (760 mmHg)</b>	No test data available.
<b>Flash Point - Closed Cup</b>	57.8 °C (136.0 °F) <i>Closed Cup</i>
<b>Flammability (solid, gas)</b>	Not applicable to liquids
<b>Flammable Limits In Air</b>	<b>Lower:</b> No test data available

<b>Vapor Pressure</b>	<b>Upper:</b> No test data available No test data available
<b>Vapor Density (air = 1)</b>	No test data available
<b>Specific Gravity (H<sub>2</sub>O = 1)</b>	No test data available
<b>Solubility in water (by weight)</b>	Emulsion
<b>Partition coefficient, n-octanol/water (log Pow)</b>	No data available for this product. See Section 12 for individual component data.
<b>Autoignition Temperature</b>	No test data available
<b>Decomposition Temperature</b>	No test data available
<b>Kinematic Viscosity</b>	No test data available
<b>Oxidizing properties</b>	No
<b>Liquid Density</b>	0.9861 g/cm <sup>3</sup> @ 20 °C <i>OECD 109</i>

## 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:** Can coagulate if frozen. Active ingredient decomposes at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

**Incompatible Materials:** Avoid contact with: Strong oxidizers. Addition of chemicals may cause phase separation.

### 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: LD<sub>50</sub>, rat, female > 5,000 mg/kg

#### Dermal

As product: LD<sub>50</sub>, rat, male and female > 5,000 mg/kg

#### Inhalation

As product: LC<sub>50</sub>, 4 h, Aerosol, rat > 5.52 mg/l

No deaths occurred at this concentration.

### Eye damage/eye irritation

May cause moderate eye irritation which may be slow to heal. May cause slight corneal injury.

### Skin corrosion/irritation

Brief contact may cause slight skin irritation with local redness. May cause drying and flaking of the skin. Effects may be slow to heal.

### Sensitization

#### Skin

Has demonstrated the potential for contact allergy in mice.

#### Respiratory

No relevant data found.

### Repeated Dose Toxicity

For the active ingredient(s): Florasulam. In animals, effects have been reported on the following organs: Kidney. For the solvent(s): In animals, effects have been reported on the following organs: Liver. Kidney. Respiratory tract. Blood. Eye. Lung.

### Chronic Toxicity and Carcinogenicity

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

### Carcinogenicity Classifications:

Component	List	Classification
Cumene	IARC	Possibly carcinogenic to humans.; 2B

### 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. Did not cause birth defects in laboratory animals. For the solvent(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

For the solvent(s): In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. For the active ingredient(s): In animal studies, did not interfere with reproduction.

### Genetic Toxicology

For the active ingredient(s): For the component(s) tested: In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

## 12. Ecological Information

### Toxicity

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 an acute basis (LD50 > 2000 mg/kg).

### Fish Acute & Prolonged Toxicity

LC50, Oncorhynchus mykiss (rainbow trout), flow-through test, 96 h: 18.6 mg/l

### Aquatic Invertebrate Acute Toxicity

EC50, Daphnia magna (Water flea), semi-static test, 48 h, immobilization: 27 - 35 mg/l

### Aquatic Plant Toxicity

ErC50, Lemna minor (duckweed), Growth rate inhibition, 7 d: 0.156 mg/l

ErC50, Pseudokirchneriella subcapitata (green algae), Growth rate inhibition, 72 h: 1.730 mg/l

### Toxicity to Above Ground Organisms

oral LD50, Colinus virginianus (Bobwhite quail): 2,000 mg/kg

contact LD50, Apis mellifera (bees): > 200 micrograms/bee

oral LD50, Apis mellifera (bees): > 215.8 micrograms/bee

### Toxicity to Soil Dwelling Organisms

LC50, Eisenia fetida (earthworms), 14 d: 320 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:

Biodegradation	Exposure Time	Method	10 Day Window
2 %	28 d	OECD 301B Test	fail

#### Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
7.04E-11 cm <sup>3</sup> /s	1.82 h	Estimated.

Theoretical Oxygen Demand: 0.85 mg/mg

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:**

Biodegradation	Exposure Time	Method	10 Day Window
32 %	28 d	OECD 301D Test	fail

**Theoretical Oxygen Demand:** 2.2 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%).

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:**

Biodegradation	Exposure Time	Method	10 Day Window
4 - 18 %	28 d	OECD 301C Test	Not applicable

**Indirect Photodegradation with OH Radicals**

Rate Constant	Atmospheric Half-life	Method
1.670E-11 cm <sup>3</sup> /s	0.641 d	Estimated.

**Theoretical Oxygen Demand:** 3.19 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:**

Biodegradation	Exposure Time	Method	10 Day Window
81 %	28 d	OECD 301F Test	pass
96 %	64 d	OECD 306 Test	Not applicable

**Indirect Photodegradation with OH Radicals**

Rate Constant	Atmospheric Half-life	Method
1.28E-11 cm <sup>3</sup> /s	10 h	Estimated.

**Biological oxygen demand (BOD):**

BOD 5	BOD 10	BOD 20	BOD 28
69.0 %	70.0 %	86.0 %	

**Chemical Oxygen Demand:** 1.53 mg/mg

**Theoretical Oxygen Demand:** 1.68 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:**

Biodegradation	Exposure Time	Method	10 Day Window
0 %	28 d	OECD 301C Test	Not applicable
50 %	4.4 d	Calculated	Not applicable

**Indirect Photodegradation with OH Radicals**

Rate Constant	Atmospheric Half-life	Method
3.51E-11 cm <sup>3</sup> /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:**

Biodegradation	Exposure Time	Method	10 Day Window
86 %	28 d	OECD 301D Test	pass



Indirect Photodegradation with OH Radicals			
Rate Constant	Atmospheric Half-life		Method
6.90E-12 cm <sup>3</sup> /s	1.55 d		Estimated.
Biological oxygen demand (BOD):			
BOD 5	BOD 10	BOD 20	BOD 28
40.000 %	62.000 %	70.000 %	
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 cm <sup>3</sup> /s	19.7 h		Estimated.
Biological oxygen demand (BOD):			
BOD 5	BOD 10	BOD 20	BOD 28
37.000 %	58.000 %	72.000 %	
Theoretical Oxygen Demand: 3.17 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: **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: **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).

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: **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.

Data for Component: **1,3,5-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):** 3.42 Measured

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

Data for Component: **Cumene**

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

**Partition coefficient, n-octanol/water (log Pow):** 3.4 - 3.7 Measured

**Bioconcentration Factor (BCF):** 35.5; Fish; Measured

Data for Component: **Xylene**

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

**Partition coefficient, n-octanol/water (log Pow):** 3.12 Measured

**Bioconcentration Factor (BCF):** 15 - 21; Fish; Measured

**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\*m<sup>3</sup>/mole.; 20 °C

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\*m<sup>3</sup>/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).

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\*m<sup>3</sup>/mole; 25 °C Measured

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\*m<sup>3</sup>/mole Measured

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

**Mobility in soil:** Potential for mobility in soil is low (Koc between 500 and 2000).

**Partition coefficient, soil organic carbon/water (Koc):** 741.65 Estimated.

**Henry's Law Constant (H):** 1.97E-02 atm\*m<sup>3</sup>/mole; 25 °C Estimated.

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

Air	Water.	Biota	Soil	Sediment
97.26 %	0.62 %	< 0.01 %	2.08 %	0.05 %

Data for Component: **Cumene**

**Mobility in soil:** Potential for mobility in soil is low (Koc between 500 and 2000).

**Partition coefficient, soil organic carbon/water (Koc):** 800 - 2,800 Estimated.

**Henry's Law Constant (H):** 1.15E-02 atm\*m<sup>3</sup>/mole; 25 °C Measured

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

Air	Water.	Biota	Soil	Sediment
98.38 %	0.33 %	< 0.01 %	1.26 %	0.03 %

Data for Component: **Xylene**

**Mobility in soil:** Potential for mobility in soil is medium (Koc between 150 and 500).

**Partition coefficient, soil organic carbon/water (Koc):** 443 Estimated.

**Henry's Law Constant (H):** 7.45E-03 atm\*m<sup>3</sup>/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

**DOT Non-Bulk**

**Proper Shipping Name:** FLAMMABLE LIQUID, N.O.S.

**Technical Name:** PETROLEUM NAPHTHA, 1,2,4-TRIMETHYLBENZENE

**Hazard Class:** 3 **ID Number:** UN1993 **Packing Group:** PG III

**DOT Bulk****Proper Shipping Name:** FLAMMABLE LIQUID, N.O.S.**Technical Name:** PETROLEUM NAPHTHA, 1,2,4-TRIMETHYLBENZENE**Hazard Class:** 3 **ID Number:** UN1993 **Packing Group:** PG III**IMDG****Proper Shipping Name:** FLAMMABLE LIQUID, N.O.S.**Technical Name:** PETROLEUM NAPHTHA, 1,2,4-TRIMETHYLBENZENE**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:** PETROLEUM NAPHTHA, 1,2,4-TRIMETHYLBENZENE**Hazard Class:** 3 **ID Number:** UN1993 **Packing Group:** PG III**Cargo Packing Instruction:** 366**Passenger Packing Instruction:** 355**Additional Information**

Reportable quantity: 32,237 lb – XYLENE

**MARINE POLLUTANT**

Fluroxypyr

FLORASULAM

*This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.*

<b>15. Regulatory Information</b>
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**OSHA Hazard Communication Standard**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312**

<b>Immediate (Acute) Health Hazard</b>	Yes
<b>Delayed (Chronic) Health Hazard</b>	Yes
<b>Fire Hazard</b>	Yes
<b>Reactive Hazard</b>	No
<b>Sudden Release of Pressure Hazard</b>	No

**Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313**

This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

<b>Component</b>	<b>CAS #</b>	<b>Amount</b>
1,2,4-Trimethylbenzene	95-63-6	9.3%
Cumene	98-82-8	1.2%

**Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:**

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
1,2,4-Trimethylbenzene	95-63-6	9.3%
Propylene glycol	57-55-6	3.4%
1,3,5-Trimethylbenzene	108-67-8	2.5%
Cumene	98-82-8	1.3%

**Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:**

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

**California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)**

WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

**Toxic Substances Control Act (TSCA)**

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

## 16. Other Information

### Hazard Rating System

NFPA	Health	Fire	Reactivity
11	1	2	0

### Revision

Identification Number: 1018110 / 1016 / Issue Date 09/30/2013 / Version: 5.0

DAS Code: GF-2257

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

### Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

*Dow AgroSciences LLC 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.*

