

SAFETY DATA SHEET

DOW AGROSCIENCES LLC

Product name: STARANE™ NXT Herbicide

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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. IDENTIFICATION

Product name: STARANE™ NXT Herbicide

Recommended use of the chemical and restrictions on use

Identified uses: End use herbicide product

COMPANY IDENTIFICATION

DOW AGROSCIENCES LLC
9330 ZIONSVILLE RD
INDIANAPOLIS IN 46268-1053
UNITED STATES

Customer Information Number:

800-992-5994

info@dow.com

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: 800-992-5994

Local Emergency Contact: 352-323-3500

2. HAZARDS IDENTIFICATION

Hazard classification

This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

Flammable liquids - Category 3

Acute toxicity - Category 4 - Oral

Eye irritation - Category 2A

Skin sensitisation - Sub-category 1A

Carcinogenicity - Category 2

Reproductive toxicity - Category 1B

Specific target organ toxicity - single exposure - Category 2 - Oral

Specific target organ toxicity - single exposure - Category 3

Specific target organ toxicity - repeated exposure - Category 2 - Oral

Aspiration hazard - Category 1

Label elements

Hazard pictograms



Signal word: **DANGER!**

Hazards

Flammable liquid and vapour.

Harmful if swallowed.

May be fatal if swallowed and enters airways.

May cause an allergic skin reaction.

Causes serious eye irritation.

May cause respiratory irritation.

May cause drowsiness or dizziness.

Suspected of causing cancer.

May damage fertility or the unborn child.

May cause damage to organs if swallowed.

May cause damage to organs through prolonged or repeated exposure if swallowed.

Precautionary statements

Prevention

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Keep container tightly closed.

Ground/bond container and receiving equipment.

Use explosion-proof electrical/ ventilating/ lighting/ equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

Wash skin thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Contaminated work clothing should not be allowed out of the workplace.

Wear protective gloves/ eye protection/ face protection.

Use personal protective equipment as required.

Response

IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.

IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IF exposed or concerned: Get medical advice/ attention.

Do NOT induce vomiting.

If skin irritation or rash occurs: Get medical advice/ attention.

If eye irritation persists: Get medical advice/ attention.

Wash contaminated clothing before reuse.

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage

Store in a well-ventilated place. Keep container tightly closed.

Store in a well-ventilated place. Keep cool.

Store locked up.

Disposal

Dispose of contents/ container to an approved waste disposal plant.

Other hazards

no data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CASRN	Concentration
Bromoxynil octanoate	1689-99-2	37.3%
Fluroxypyr 1-methylheptyl ester	81406-37-3	9.2%
1,2,4-Trimethylbenzene	95-63-6	12.9%
1,3,5-Trimethylbenzene	108-67-8	3.4%
Cumene	98-82-8	1.7%
Heavy aromatic naphtha	64742-94-5	1.0%
Xylene	1330-20-7	0.4%
Naphthalene	91-20-3	0.1%
Balance	Not available	34.0%

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.

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 immediately available.

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 any immediate medical attention and special treatment needed

Notes to physician: Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. Probable mucosal damage may contraindicate the use of gastric lavage. 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. FIREFIGHTING MEASURES

Suitable extinguishing media: Water fog or fine spray. 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.

Unsuitable extinguishing media: no data available

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 bromide. 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. Consider feasibility of a controlled burn to minimize environment damage. Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. 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. 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. Avoid accumulation of water. Product may be carried across water surface spreading fire or contracting an ignition source. 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. Refer to section 7, Handling, for additional precautionary measures. Keep personnel out of low areas. 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. 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. Material may float on water and any runoff may create an explosion or fire hazard if ignited. 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

Precautions for safe 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. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. 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. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage: Minimize sources of ignition, such as static build-up, heat, spark or flame. 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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Fluroxypyr 1-methylheptyl ester	Dow IHG	TWA	10 mg/m3
1,2,4-Trimethylbenzene	ACGIH	TWA	25 ppm
1,3,5-Trimethylbenzene	ACGIH	TWA	25 ppm
Cumene	ACGIH	TWA	50 ppm
	OSHA Z-1	TWA	245 mg/m3 50 ppm
	OSHA Z-1	TWA	Absorbed via skin
	OSHA P0	TWA	245 mg/m3 50 ppm
Xylene	ACGIH	TWA	BEI
	ACGIH	STEL	BEI
	OSHA Z-1	TWA	435 mg/m3 100 ppm
	ACGIH	TWA	100 ppm
	ACGIH	STEL	150 ppm
Naphthalene	Dow IHG	TWA	10 ppm
	Dow IHG	TWA	Absorbed via skin
	Dow IHG	STEL	15 ppm
	Dow IHG	STEL	Absorbed via skin
	ACGIH	TWA	10 ppm
	ACGIH	TWA	Absorbed via skin
	OSHA Z-1	TWA	50 mg/m3 10 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.

Exposure controls

Engineering controls: 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.

Individual protection measures

Eye/face protection: Use chemical goggles.

Skin protection

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Styrene/butadiene rubber. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. 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.

Other 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.

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state	Liquid.
Color	Yellow to brown
Odor	Mild
Odor Threshold	no data available
pH	No test data available
Melting point/range	Not applicable
Freezing point	No test data available
Boiling point (760 mmHg)	No test data available
Flash point	closed cup 51.9 °C (125.4 °F) <i>Tag Closed Cup ASTM D56</i>
Evaporation Rate (Butyl Acetate = 1)	no data available
Flammability (solid, gas)	Not Applicable
Lower explosion limit	No test data available
Upper explosion limit	No test data available
Vapor Pressure	No test data available
Relative Vapor Density (air = 1)	No test data available
Relative Density (water = 1)	No test data available
Water solubility	No test data available
Partition coefficient: n-octanol/water	no data available
Auto-ignition temperature	No test data available
Decomposition temperature	No test data available
Kinematic Viscosity	no data available
Explosive properties	no data available
Oxidizing properties	no data available
Liquid Density	1.093 g/cm ³ <i>NAPM 2A.00</i>
Molecular weight	no data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: no data available

Chemical stability: Unstable at elevated 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: Acids. Oxidizers.

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 bromide. Nitrogen oxides. Toxic gases are released during decomposition.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity

Moderate 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. Swallowing may result in gastrointestinal irritation or ulceration.

As product:

LD50, Rat, female, 310.2 mg/kg

Acute dermal toxicity

Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product:

LD50, Rat, male and female, > 5,000 mg/kg

Acute inhalation toxicity

Prolonged excessive exposure to mist may 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.

As product:

LC50, Rat, male and female, 4 Hour, dust/mist, > 2.33 mg/l No deaths occurred at this concentration.

Skin corrosion/irritation

Brief contact may cause slight skin irritation with local redness.

Serious eye damage/eye irritation

May cause severe eye irritation.
May cause slight corneal injury.
Effects may be delayed.

Sensitization

Has demonstrated the potential for contact allergy in mice.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Specific Target Organ Systemic Toxicity (Repeated Exposure)

For the active ingredient(s):

Bromoxynil Octanoate.

In animals, effects have been reported on the following organs:

Liver.

Blood-forming organs (Bone marrow & Spleen).

Heart.

Thymus.

Based on information for component(s):

In animals, effects have been reported on the following organs:

Kidney.

Liver.

Eye.

Blood.

Respiratory tract.

Lung.

Gastrointestinal tract.

Thyroid.

Urinary tract.

Carcinogenicity

Contains naphthalene which 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.

For similar active ingredient(s). Has caused cancer in some laboratory animals. For the active ingredient(s): Fluroxypyr 1-methylheptyl ester. 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.

Teratogenicity

For the active ingredient(s): 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 caused birth defects in lab animals only at doses producing severe toxicity in the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Reproductive toxicity

For the active ingredient(s): Fluroxypyr 1-methylheptyl ester. In animal studies, did not interfere with reproduction.

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.

Mutagenicity

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

Aspiration Hazard

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

Carcinogenicity

Component	List	Classification
Cumene	IARC	Group 2B: Possibly carcinogenic to humans
Naphthalene	IARC	Group 2B: Possibly carcinogenic to humans
	US NTP	Reasonably anticipated to be a human carcinogen
	ACGIH	A3: Confirmed animal carcinogen with unknown relevance to humans.

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Toxicity

Bromoxynil octanoate

Acute toxicity to fish

Material is very highly toxic to aquatic organisms on an acute basis (LC50/EC50 <0.1 mg/L in the most sensitive species).

LC50, *Oncorhynchus mykiss* (rainbow trout), 96 Hour, 0.041 - 0.150 mg/l

LC50, *Lepomis macrochirus* (Bluegill sunfish), 96 Hour, 0.029 - 0.061 mg/l

Acute toxicity to aquatic invertebrates

EC50, *Daphnia magna* (Water flea), 48 Hour, 0.041 - 0.161 mg/l

Acute toxicity to algae/aquatic plants

EC50, blue-green alga *Anabaena flos-aquae*, static test, 5 d, > 0.630 mg/l

EC50, diatom *Navicula* sp., 5 d, 0.043 - 0.051 mg/l

EC50, *Skeletonema costatum*, static test, 5 d, 0.140 mg/l

EC50, *Pseudokirchneriella subcapitata* (green algae), 5 d, 0.210 - 0.220 mg/l

LC50, *Lemna minor* (duckweed), 14 d, > 0.073 mg/l

Toxicity to Above Ground Organisms

Material is slightly toxic to birds on a dietary basis (LC50 between 1001 and 5000 ppm).

Material is moderately toxic to birds on an acute basis (LD50 between 51 and 500 mg/kg).

dietary LC50, *Colinus virginianus* (Bobwhite quail), 8 d, 1315mg/kg diet.

dietary LC50, *Anas platyrhynchos* (Mallard duck), 5 d, 2150mg/kg diet.
oral LD50, *Anas platyrhynchos* (Mallard duck), 8 d, 200mg/kg bodyweight.
oral LD50, *Coturnix japonica* (Japanese quail), 10 d, 100mg/kg bodyweight.
contact LD50, *Apis mellifera* (bees), 48 Hour, 2 - 100µg/bee
oral LD50, *Apis mellifera* (bees), 96 Hour, > 119.8µg/bee

Toxicity to soil-dwelling organisms

EC50, *Eisenia fetida* (earthworms), 14 d, 294 mg/kg

Fluroxypyr 1-methylheptyl ester**Acute toxicity to fish**

Material is very highly toxic to aquatic organisms on an acute basis (LC50/EC50 <0.1 mg/L in the most sensitive species).

LC50, *Oncorhynchus mykiss* (rainbow trout), semi-static test, 96 Hour, > 0.225 mg/l, OECD Test Guideline 203 or Equivalent

Toxicity to aquatic species occurs at concentrations above material's water solubility.

Acute toxicity to aquatic invertebrates

EC50, *Daphnia magna* (Water flea), semi-static test, 48 Hour, > 0.183 mg/l, OECD Test Guideline 202 or Equivalent

Toxicity to aquatic species occurs at concentrations above material's water solubility.

Acute toxicity to algae/aquatic plants

ErC50, diatom *Navicula* sp., static test, 72 Hour, 0.24 mg/l, OECD Test Guideline 201 or Equivalent

EbC50, alga *Scenedesmus* sp., 72 Hour, > 0.47 mg/l

ErC50, *Pseudokirchneriella subcapitata* (green algae), 72 Hour, > 1.410 mg/l

EC50, *Lemna gibba*, 14 d, > 2.31 mg/l

Chronic toxicity to fish

NOEC, Rainbow trout (*Oncorhynchus mykiss*), 0.32 mg/l

Toxicity to Above Ground Organisms

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).

oral LD50, *Colinus virginianus* (Bobwhite quail), 5 d, > 2000mg/kg bodyweight.

dietary LC50, *Colinus virginianus* (Bobwhite quail), > 5000mg/kg diet.

oral LD50, *Apis mellifera* (bees), 48 Hour, > 100micrograms/bee

contact LD50, *Apis mellifera* (bees), 48 Hour, > 100micrograms/bee

Toxicity to soil-dwelling organisms

LC50, *Eisenia fetida* (earthworms), > 1,000 mg/kg

1,2,4-Trimethylbenzene**Acute toxicity to fish**

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).

LC50, *Pimephales promelas* (fathead minnow), flow-through test, 96 Hour, 7.7 mg/l

Acute toxicity to aquatic invertebrates

EC50, *Daphnia magna* (Water flea), 48 Hour, 3.6 mg/l

1,3,5-Trimethylbenzene**Acute toxicity to fish**

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).
LC50, Carassius auratus (goldfish), flow-through test, 96 Hour, 12.5 mg/l, Method Not Specified.

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), Static, 48 Hour, 6 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

EbC50, Desmodesmus subspicatus (green algae), 48 Hour, Biomass, 25 mg/l, OECD Test Guideline 201 or Equivalent

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 0.4 mg/l

Cumene

Acute toxicity to fish

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).
LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 Hour, 2.7 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 4.0 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

EbC50, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, Biomass, 2.6 mg/l, OECD Test Guideline 201 or Equivalent

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 0.35 mg/l

Toxicity to Above Ground Organisms

oral LD50, redwing blackbird (Agelaius phoeniceus), > 98 mg/kg

Heavy aromatic naphtha

Acute toxicity to fish

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).
LC50, Gambusia affinis (Mosquito fish), 96 Hour, 811 mg/l

Acute toxicity to algae/aquatic plants

EC50, Algae, 72 Hour, 21 - 165 mg/l

Xylene

Acute toxicity to fish

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).
LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 Hour, 2.6 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

IC50, Daphnia magna (Water flea), 24 Hour, 1 - 4.7 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

ErC50, Pseudokirchneriella subcapitata (algae), Static, 73 Hour, Growth rate, 4.36 mg/l, OECD Test Guideline 201 or Equivalent

NOEC, Pseudokirchneriella subcapitata (green algae), 73 Hour, Growth rate, 0.44 mg/l, OECD Test Guideline 201 or Equivalent

Chronic toxicity to fish

NOEC, Oncorhynchus mykiss (rainbow trout), flow-through, 56 d, mortality, > 1.3 mg/l

Naphthalene

Acute toxicity to fish

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).

LC50, Oncorhynchus mykiss (rainbow trout), 96 Hour, 0.11 mg/l

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 1.6 - 24.1 mg/l

Chronic toxicity to fish

NOEC, Other, flow-through, 40 d, mortality, 0.37 mg/l

Balance

Acute toxicity to fish

No relevant data found.

Persistence and degradability

Bromoxynil octanoate

Biodegradability: 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.

Biodegradation: < 37 %

Stability in Water (1/2-life)

Hydrolysis, half-life, 11 d, pH 7

Hydrolysis, half-life, 1.7 d, pH 9

Photolysis, half-life, 4 - 5 Hour

Fluroxypyr 1-methylheptyl ester

Biodegradability: Material is not readily biodegradable according to OECD/EEC guidelines.
10-day Window: Fail

Biodegradation: 32 %

Exposure time: 28 d

Method: OECD Test Guideline 301D or Equivalent

Theoretical Oxygen Demand: 2.2 mg/mg

Stability in Water (1/2-life)

, half-life, 454 d

1,2,4-Trimethylbenzene

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

10-day Window: Not applicable

Biodegradation: 4 - 18 %

Exposure time: 28 d

Method: OECD Test Guideline 301C or Equivalent

Theoretical Oxygen Demand: 3.19 mg/mg

Photodegradation

Test Type: Half-life (indirect photolysis)

Sensitizer: OH radicals

Atmospheric half-life: 0.641 d

Method: Estimated.

1,3,5-Trimethylbenzene

Biodegradability: 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.

10-day Window: Not applicable

Biodegradation: 0 %

Exposure time: 28 d

Method: OECD Test Guideline 301C or Equivalent

10-day Window: Not applicable

Biodegradation: 50 %

Exposure time: 4.4 d

Method: Calculated.

Theoretical Oxygen Demand: 3.19 mg/mg

Photodegradation

Test Type: Half-life (indirect photolysis)

Sensitizer: OH radicals

Atmospheric half-life: 3.7 Hour

Method: Estimated.

Cumene

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Pass

Biodegradation: 86 %

Exposure time: 28 d

Method: OECD Test Guideline 301D or Equivalent

Theoretical Oxygen Demand: 3.20 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	40.000 %
10 d	62.000 %
20 d	70.000 %

Photodegradation**Test Type:** Half-life (indirect photolysis)**Sensitizer:** OH radicals**Atmospheric half-life:** 1.55 d**Method:** Estimated.**Heavy aromatic naphtha****Biodegradability:** Material is not readily biodegradable according to OECD/EEC guidelines.**Xylene****Biodegradability:** Material is expected to be readily biodegradable.

10-day Window: Pass

Biodegradation: > 60 %**Exposure time:** 10 d**Method:** OECD Test Guideline 301F or Equivalent**Theoretical Oxygen Demand:** 3.17 mg/mg**Biological oxygen demand (BOD)**

Incubation Time	BOD
5 d	37.000 %
10 d	58.000 %
20 d	72.000 %

Photodegradation**Test Type:** Half-life (indirect photolysis)**Sensitizer:** OH radicals**Atmospheric half-life:** 19.7 Hour**Method:** Estimated.**Naphthalene****Biodegradability:** Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%).**Theoretical Oxygen Demand:** 3.00 mg/mg**Biological oxygen demand (BOD)**

Incubation Time	BOD
5 d	57.000 %
10 d	71.000 %
20 d	71.000 %

Photodegradation**Test Type:** Half-life (indirect photolysis)**Sensitizer:** OH radicals**Atmospheric half-life:** 5.9 Hour**Method:** Estimated.**Balance**

Biodegradability: No relevant data found.

Bioaccumulative potential

Bioaccumulation: No data available.

Mobility in soil

Bromoxynil octanoate

Partition coefficient(Koc): 21000 Estimated.

Fluroxypyr 1-methylheptyl ester

Expected to be relatively immobile in soil (Koc > 5000).

Partition coefficient(Koc): 6200 - 43000

1,2,4-Trimethylbenzene

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

Partition coefficient(Koc): 720 Estimated.

1,3,5-Trimethylbenzene

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

Partition coefficient(Koc): 741.65 Estimated.

Cumene

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

Partition coefficient(Koc): 800 - 2800 Estimated.

Heavy aromatic naphtha

No relevant data found.

Xylene

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

Partition coefficient(Koc): 443 Estimated.

Naphthalene

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

Partition coefficient(Koc): 240 - 1300 Measured

Balance

No relevant data found.

13. DISPOSAL CONSIDERATIONS

Disposal methods: 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

Proper shipping name	Pesticides, liquid, toxic, flammable, n.o.s.(Bromoxynil octanoate, Xylene)
UN number	UN 2903
Class	6.1 (3)
Packing group	III
Reportable Quantity	Xylene

Classification for SEA transport (IMO-IMDG):

Proper shipping name	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S.(Bromoxynil octanoate, Xylene)
UN number	UN 2903
Class	6.1 (3)
Packing group	III
Marine pollutant	Bromoxynil octanoate, Xylene
Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Proper shipping name	Pesticide, liquid, toxic, flammable, n.o.s.(Bromoxynil octanoate, Xylene)
UN number	UN 2903
Class	6.1 (3)
Packing group	III

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. 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.

15. REGULATORY INFORMATION

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

Acute Health Hazard
Chronic Health Hazard

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

Components	CASRN
Cumene	98-82-8
1,2,4-Trimethylbenzene	95-63-6
Naphthalene	91-20-3
Bromoxynil octanoate	1689-99-2

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.

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 birth defects or other reproductive harm.

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.

Components	CASRN
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Cumene	98-82-8
Heavy aromatic naphtha	64742-94-5

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.

United States TSCA Inventory (TSCA)

This product contains chemical substance(s) exempt from U.S. EPA TSCA Inventory requirements. It is regulated as a pesticide subject to Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requirements.

Federal Insecticide, Fungicide and Rodenticide Act

EPA Registration Number: 62719-557

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

WARNING

May be fatal if swallowed.

Causes substantial but temporary eye injury

Harmful if inhaled

Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

16. OTHER INFORMATION

Hazard Rating System

NFPA

Health	Fire	Reactivity
2	2	1

Revision

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

Legend

Absorbed via skin	Absorbed via skin
ACGIH	USA. ACGIH Threshold Limit Values (TLV)
BEI	Biological Exposure Indices
Dow IHG	Dow Industrial Hygiene Guideline
OSHA P0	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
OSHA Z-1	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
STEL	Short term exposure limit
TWA	Time weighted average

Information Source and References

This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

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.