

Product name: BARNSTORM™ Herbicide**Issue Date:** 28.11.2019

DOW AGROSCIENCES AUSTRALIA LIMITED encourages you and expects you to read and understand the entire SDS as there is important information throughout the document. This SDS provides users with information relating to the protection of human health and safety at the workplace, protection of the environment and supports emergency response. Product users and applicators should primarily refer to the product label attached to or accompanying the product container. actions.

SECTION 1: IDENTIFICATION: PRODUCT IDENTIFIER AND CHEMICAL IDENTITY

Product name: Barnstorm™ Herbicide**Recommended use of the chemical and restrictions on use****Identified uses:** End use herbicide product**COMPANY IDENTIFICATION**DOW AGROSCIENCES AUSTRALIA LIMITED
LEVEL 9, 67 ALBERT AVENUE
CHATSWOOD NSW 2067
AUSTRALIA**Customer Information Number:**1800-700-096
aucustomerservice@corteva.com**EMERGENCY TELEPHONE NUMBER****24-Hour Emergency Contact:** +61 2 9474 7350**Local Emergency Contact:** 1800-370-754**For advice, contact a doctor (at once) or the Australian Poisons Information Centre:** 131 126**Transport Emergency Only Dial** 000

SECTION 2: HAZARD(S) IDENTIFICATION

GHS Classification

Flammable liquids - Category 4

Serious eye damage/eye irritation – Category 2A

Carcinogenicity - Category 2

Aspiration hazard - Category 1

Acute aquatic toxicity - Category 1

Chronic aquatic toxicity - Category 1

GHS label elements**Hazard pictograms**Signal word: **DANGER!****Hazard statements**

Combustible liquid.

May be fatal if swallowed and enters airways.

Causes serious eye irritation.

Suspected of causing cancer.

Very toxic to aquatic life with long lasting effects.

Precautionary statements**Prevention**

Obtain special instructions before use.

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

Avoid release to the environment.

Wear protective gloves/ eye protection/ face protection.

Use personal protective equipment as required.

Response

IF SWALLOWED: Immediately call a POISON CENTER/doctor.

IF exposed or concerned: Get medical advice/ attention.

Do NOT induce vomiting.

If eye irritation persists: Get medical advice/attention.

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

Other hazards

No data available

SECTION 3: COMPOSITION AND INFORMATION ON INGREDIENTS, IN ACCORDANCE WITH SCHEDULE 8

This product is a mixture.

| Component | CASRN | Concentration |
|---|-------------|-------------------|
| Cyhalofop-butyl | 122008-85-9 | 29.44% |
| Heavy aromatic naphtha | 64742-94-5 | > 60.0 - < 70.0 % |
| Naphthalene | 91-20-3 | < 10.0 % |
| 1,2,4-Trimethylbenzene | 95-63-6 | < 5.0 % |
| Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts | 68953-96-8 | < 5.0 % |
| Solvent naphtha (petroleum), heavy aromatic | 64742-94-5 | < 5.0 % |
| N-butyl-2-(4-(5-cyano-2-fluorophenoxy)phenoxy)propionate | | < 1.0 % |

SECTION 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: 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. If hemolysis is suspected, monitor hemoglobin, hematocrit, plasma free hemoglobin, and urinalysis. Whole blood or packed RBC transfusion may be required in severe cases. Alkalinization of urine with bicarbonate may prevent renal damage. 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 pre-existing lung disease.

SECTION 5: FIREFIGHTING MEASURES

Hazchem Code: ●2X

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.

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: 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. Dense smoke is produced when product burns.

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 re-ignition 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). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

SECTION 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. 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. Small spills: Absorb with materials such as: Clay. Dirt. Sand. Sweep up. Collect in suitable and properly labelled containers. Large spills: Contact Corteva Agriscience for clean-up assistance. See Section 13, Disposal Considerations, for additional information.

SECTION 7: HANDLING AND STORAGE, INCLUDING HOW THE CHEMICAL MAY BE SAFELY USED

Precautions for safe handling: Keep out of reach of children. Keep away from heat, sparks and flame. Do not swallow. Avoid breathing vapour or mist. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. 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. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe 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.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Control parameters

Exposure limits are listed below, if they exist.

| Component | Regulation | Type of listing | Value/Notation |
|--|------------|-----------------|------------------------------|
| Heavy aromatic naphtha | Dow IHG | TWA | 100 mg/m ³ |
| | Dow IHG | STEL | 300 mg/m ³ |
| Naphthalene | ACGIH | TWA | 10 ppm SKIN |
| | Dow IHG | TWA | 10 ppm SKIN |
| | Dow IHG | STEL | 15 ppm SKIN |
| | AU OEL | TWA | 52 mg/m ³ 10 ppm |
| 1,2,4-Trimethylbenzene | AU OEL | STEL | 79 mg/m ³ 15 ppm |
| | ACGIH | TWA | 25 ppm |
| Solvent naphtha (petroleum), heavy aromatic | AU OEL | TWA | 123 mg/m ³ 25 ppm |
| | Dow IHG | TWA | 100 mg/m ³ |
| | Dow IHG | STEL | 300 mg/m ³ |

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. If exposure causes eye discomfort, use a full-face respirator.

Skin protection

Hand protection: Use chemical resistant gloves classified under standard AS/NZS 2161.10: Protective gloves against chemicals and micro-organisms. Examples of preferred glove barrier materials include: Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Styrene/butadiene rubber. Viton. Examples of acceptable glove barrier materials include: Butyl rubber. Chlorinated polyethylene. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to AS/NZS 2161.10) is recommended. When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to AS/NZS 2161.10) is recommended.

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 vapour cartridge with a particulate pre-filter.

Other Information: Selection and use of personal protective equipment should be in accordance with the recommendations in one or more of the relevant Australian/New Zealand Standards, including:

AS/NZS 1336: Eye and face protection – Guidelines.

AS/NZS 1337: Personal eye protection - Eye and face protectors for occupational applications.

AS/NZS 1715: Selection, use and maintenance of respiratory protective equipment.

AS/NZS 2161: Occupational protective gloves.

AS/NZS 2210: Occupational protective footwear.

AS/NZS 4501: Occupational protective clothing Set

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance

| | |
|---|--|
| Physical state | Liquid. |
| Colour | Yellow |
| Odour | Solvent |
| Odour Threshold | No data available |
| pH | 6.2 1% <i>pH Electrode</i> (1% aqueous suspension) |
| Melting point/range | Not applicable |
| Freezing point | No test data available |
| Boiling point (760 mmHg) | No test data available |
| Flash point - closed cup | 67.5 °C |
| Evaporation Rate (Butyl Acetate = 1) | No data available |
| Flammability (solid, gas) | No data available |
| Lower explosion limit | 0.6 % vol |
| Upper explosion limit | 7 % vol |
| Vapour Pressure | No test data available |
| Relative Vapour Density (air = 1) | No test data available |
| Relative Density (water = 1) | 0.9684 at 20 °C / 4 °C <i>Digital Density Meter (Oscillating Coil)</i> |
| Water solubility | Emulsifiable |
| Partition coefficient: n-octanol/water | No data available |
| Auto-ignition temperature | No test data available |
| Decomposition temperature | No test data available |
| Kinematic Viscosity | No test data available |
| Explosive properties | No data available |
| Oxidizing properties | No data available |
| Liquid Density | 0.9684 g/cm ³ at 20 °C <i>Digital density meter</i> |
| Molecular weight | No data available |

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

SECTION 10: STABILITY AND REACTIVITY

Reactivity: No data available.

Chemical stability: Thermally stable at recommended temperatures and pressures.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid.

Incompatible materials: Avoid contact with: 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. Nitrogen oxides. Toxic gases are released during decomposition.

SECTION 11: TOXICOLOGICAL INFORMATION

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

Acute toxicity

Acute oral toxicity

Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. Ingestion of naphthalene by humans has caused hemolytic anemia.

As product: Single dose oral LD50 has not been determined.
Based on information for component(s): LD50, Rat, >5,000 mg/kg Estimated.

Acute dermal toxicity

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

As product: The dermal LD50 has not been determined.
Based on information for component(s): LD50, Rabbit, > 2,000 mg/kg Estimated.

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 anaesthetic or narcotic effects; dizziness and drowsiness may be observed.

As product: The LC50 has not been determined.

Skin corrosion/irritation

Brief contact may cause slight skin irritation with local redness.
Repeated exposure may cause irritation, even a burn.
May cause drying and flaking of the skin.

Serious eye damage/eye irritation

May cause moderate eye irritation which may be slow to heal.
May cause corneal injury.
Vapour may cause eye irritation experienced as mild discomfort and redness.

Sensitization

For the solvent(s): Did not cause allergic skin reactions when tested in guinea pigs.
For the minor component(s): Skin contact may cause an allergic skin reaction in a small proportion of individuals.

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): In animals, effects have been reported on the following organs:
Kidney. Liver. Gall bladder.

For the major component(s): In animals, effects have been reported on the following organs: Gastrointestinal tract. Urinary tract. Thyroid. Lung.
Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

For the minor component(s): In animals, effects have been reported on the following organs: Respiratory tract.
Ingestion of naphthalene by humans has caused haemolytic anaemia.
Excessive exposure may cause hemolysis, thereby impairing the blood's ability to transport oxygen.

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). Did not cause cancer in laboratory animals.

Teratogenicity

For the active ingredient(s): For the minor component(s): Has been toxic to the foetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals. For the major component(s): Did not cause birth defects or any other foetal effects in laboratory animals.

Reproductive toxicity

For the active ingredient(s): In animal studies, did not interfere with reproduction.
For the major component(s): No relevant data found.

Mutagenicity

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

Aspiration Hazard

May be fatal if swallowed and enters airways.

COMPONENTS INFLUENCING TOXICOLOGY:

Cyhalofop-butyl

Acute inhalation toxicity

Prolonged exposure is not expected to cause adverse effects. Based on the available data, narcotic effects were not observed. Based on the available data, respiratory irritation was not observed.

LC50, Rat, male and female, 4 Hour, dust/mist, > 5.63 mg/l No deaths occurred at this concentration.

Heavy aromatic naphtha

Acute inhalation toxicity

LC50, Rat, 4 Hour, dust/mist, > 4.8 mg/l

LC50, Rat, 4 Hour, vapour, > 0.2 mg/l No deaths occurred following exposure to a saturated atmosphere.

Naphthalene**Acute inhalation toxicity**

Excessive exposure may cause irritation to upper respiratory tract (nose and throat). Excessive exposure may cause lung injury. Signs and symptoms of excessive exposure may include: Headache. Confusion. Sweating. Nausea and/or vomiting.
LC50, Rat, 4 Hour, vapour, > 0.41 mg/l The LC50 value is greater than the Maximum Attainable Concentration.

1,2,4-Trimethylbenzene**Acute inhalation toxicity**

Prolonged excessive exposure may cause serious adverse effects, even death. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. May cause central nervous system effects. Symptoms of excessive exposure may be anaesthetic or narcotic effects; dizziness and drowsiness may be observed.
LC50, Rat, 4 Hour, vapour, 18 mg/l

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts**Acute inhalation toxicity**

The LC50 has not been determined.

Solvent naphtha (petroleum), heavy aromatic**Acute inhalation toxicity**

For similar material(s): LC50, Rat, 4 Hour, dust/mist, > 4.778 mg/l

N-Butyl-2-(4-(5-cyano-2-fluorophenoxy)phenoxy)propionate**Acute inhalation toxicity**

Prolonged exposure is not expected to cause adverse effects. Based on the available data, narcotic effects were not observed. Based on the available data, respiratory irritation was not observed.
For similar material(s): LC50, Rat, male and female, 4 Hour, dust/mist, > 5.63 mg/l No deaths occurred at this concentration.

SECTION 12: ECOLOGICAL INFORMATION

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

Ecotoxicity**Cyhalofop-butyl****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, Lepomis macrochirus (Bluegill sunfish), flow-through test, 96 Hour, 0.76 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), 48 Hour, > 2.7 mg/l, OECD Test Guideline 202

EC50, eastern oyster (Crassostrea virginica), flow-through test, 96 Hour, 0.52 mg/l

Acute toxicity to algae/aquatic plants

EbC50, Pseudokirchneriella subcapitata (green algae), 96 Hour, Biomass, > 1 mg/l

Toxicity to bacteria

EC50, activated sludge, > 100 mg/l

Chronic toxicity to fish

NOEC, Pimephales promelas (fathead minnow), flow-through test, 28 d, survival, 0.134 mg/l
LOEC, Pimephales promelas (fathead minnow), flow-through test, 28 d, survival, 0.287 mg/l
MATC (Maximum Acceptable Toxicant Level), Pimephales promelas (fathead minnow), flow-through test, 28 d, survival, 0.196 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), flow-through test, 21 d, growth, 0.0474 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, Anas platyrhynchos (Mallard duck), > 2250mg/kg bodyweight.
Dietary LC50, Anas platyrhynchos (Mallard duck), 8 d, > 5620mg/kg diet.
Oral LD50, Apis mellifera (bees), 48 Hour, > 100µg/bee
Contact LD50, Apis mellifera (bees), > 100µg/bee

Toxicity to soil-dwelling organisms

LC50, Eisenia fetida (earthworms), 7 d, > 1,120 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

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

Acute toxicity to algae/aquatic plants

ErC50, Skeletonema costatum (marine diatom), Growth rate inhibition, 72 Hour, 0.4 mg/l

Chronic toxicity to fish

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

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

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts**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).

For similar material(s): LC50, zebra fish (*Brachydanio rerio*), 96 Hour, 31.6 mg/l

Acute toxicity to aquatic invertebrates

EC50, *Daphnia magna* (Water flea), 48 Hour, 62 mg/l

Acute toxicity to algae/aquatic plants

For similar material(s): ErC50, *Selenastrum capricornutum* (green algae), 96 Hour, Growth rate inhibition, 29 mg/l

Toxicity to bacteria

For similar material(s):

EC50, activated sludge, 3 Hour, Respiration rates., 550 mg/l

Chronic toxicity to fish

For similar material(s): NOEC, Rainbow trout (*Salmo gairdneri*), 72 d, survival, 0.23 mg/l

Chronic toxicity to aquatic invertebrates

For similar material(s): NOEC, *Daphnia magna* (Water flea), 21 d, number of offspring, 1.18 mg/l

Solvent naphtha (petroleum), heavy aromatic**Acute toxicity to fish**

For similar material(s): 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).

EC50, *Oncorhynchus mykiss* (rainbow trout), 96 Hour, 3.6 mg/l

Acute toxicity to aquatic invertebrates

For similar material(s): EC50, *Daphnia magna* (Water flea), semi-static test, 48 Hour, 1.1 mg/l

Acute toxicity to algae/aquatic plants

For similar material(s): EC50, *Pseudokirchneriella subcapitata* (green algae), 72 Hour, 7.9 mg/l

N-Butyl-2-(4-(5-cyano-2-fluorophenoxy)phenoxy)propionate**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).

For similar material(s): LC50, *Lepomis macrochirus* (Bluegill sunfish), flow-through test, 96 Hour, 0.76 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates

EC50, *Daphnia magna* (Water flea), 48 Hour, > 2.7 mg/l, OECD Test Guideline 202

EC50, eastern oyster (*Crassostrea virginica*), flow-through test, 96 Hour, 0.52 mg/l

Acute toxicity to algae/aquatic plants

For similar material(s): EbC50, *Pseudokirchneriella subcapitata* (green algae), 96 Hour, Biomass, > 1 mg/l

Toxicity to bacteria

For similar material(s): EC50, activated sludge, > 100 mg/l

Chronic toxicity to fish

NOEC, Pimephales promelas (fathead minnow), flow-through test, 28 d, survival, 0.134 mg/l
 LOEC, Pimephales promelas (fathead minnow), flow-through test, 28 d, survival, 0.287 mg/l
 MATC (Maximum Acceptable Toxicant Level), Pimephales promelas (fathead minnow), flow-through test, 28 d, survival, 0.196 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), flow-through test, 21 d, growth, 0.0474 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, Anas platyrhynchos (Mallard duck), > 2250mg/kg bodyweight.
 Dietary LC50, Anas platyrhynchos (Mallard duck), 8 d, > 5620mg/kg diet.
 Oral LD50, Apis mellifera (bees), 48 Hour, > 100µg/bee
 Contact LD50, Apis mellifera (bees), > 100µg/bee

Toxicity to soil-dwelling organisms

LC50, Eisenia fetida (earthworms), 7 d, > 1,120 mg/kg

Persistence and degradability**Cyhalofop-butyl**

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: Fail

Biodegradation: 40 %

Exposure time: 29 d

Method: OECD Test Guideline 301B or Equivalent

Theoretical Oxygen Demand: 1.93 mg/mg

Stability in Water (1/2-life), 7 d**Photodegradation**

Atmospheric half-life: 5.88 Hour

Method: Measured

Heavy aromatic naphtha

Biodegradability: Material is not readily biodegradable according to OECD/EEC guidelines.

Naphthalene

Biodegradability: Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%).

Theoretical Oxygen Demand: 3.00 mg/mg

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.

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.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts

Biodegradability: 10-day Window: Fail

Biodegradation: 2.9 %

Exposure time: 28 d

Method: OECD Test Guideline 301E or Equivalent

Solvent naphtha (petroleum), heavy aromatic

Biodegradability: For similar material(s): Biodegradation may occur under aerobic conditions (in the presence of oxygen). 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.

N-Butyl-2-(4-(5-cyano-2-fluorophenoxy)phenoxy)propionate

Biodegradability: For similar material(s): 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: Fail

Biodegradation: 40 %

Exposure time: 29 d

Method: OECD Test Guideline 301B or Equivalent

Theoretical Oxygen Demand: 1.93 mg/mg

Stability in Water (1/2-life) , 7 d

Photodegradation

Atmospheric half-life: 5.88 Hour

Method: Measured

Bioaccumulative potential

Cyhalofop-butyl

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

Partition coefficient: n-octanol/water (log Pow): 3.32 Measured

Bioconcentration factor (BCF): < 7 Fish 28 d Measured

Heavy aromatic naphtha

Bioaccumulation: For similar material(s): Bioconcentration potential is high (BCF > 3000 or Log Pow between 5 and 7).

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 28 d Measured

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) 56 d Measured

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

Partition coefficient: n-octanol/water (log Pow): 4.6 OECD Test Guideline 107 or Equivalent

Solvent naphtha (petroleum), heavy aromatic

Bioaccumulation: For similar material(s): Bioconcentration potential is high (BCF > 3000 or Log Pow between 5 and 7).

N-Butyl-2-(4-(5-cyano-2-fluorophenoxy)phenoxy)propionate

Bioconcentration factor (BCF): < 7 Fish 28 d Measured

Mobility in Soil**Cyhalofop-butyl**

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

Partition coefficient (Koc): 5247 Measured

Heavy aromatic naphtha

No relevant data found.

Naphthalene

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

Partition coefficient (Koc): 240 - 1300 Measured

1,2,4-Trimethylbenzene

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

Partition coefficient (Koc): 720 Estimated.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts

No relevant data found.

Solvent naphtha (petroleum), heavy aromatic

No data available.

Results of PBT and vPvB assessment**Cyhalofop-butyl**

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Heavy aromatic naphtha

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Naphthalene

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

1,2,4-Trimethylbenzene

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Solvent naphtha (petroleum), heavy aromatic

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

N-Butyl-2-(4-(5-cyano-2-fluorophenoxy)phenoxy)propionate

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Other adverse effects**Cyhalofop-butyl**

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Heavy aromatic naphtha

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Naphthalene

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

1,2,4-Trimethylbenzene

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Solvent naphtha (petroleum), heavy aromatic

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

N-Butyl-2-(4-(5-cyano-2-fluorophenoxy)phenoxy)propionate

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

SECTION 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.

This product when disposed of in its unused and uncontaminated state should be treated as a hazardous waste.

SECTION 14: TRANSPORT INFORMATION

ADG

| | |
|-----------------------------|---|
| Proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Cyhalofop-butyl) |
| UN number | UN 3082 |
| Class | 9 |
| Packing group | III |
| Marine pollutant | Cyhalofop-butyl |

Classification for SEA transport (IMO-IMDG):

| | |
|---|---|
| Proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Cyhalofop-butyl) |
| UN number | UN 3082 |
| Class | 9 |
| Packing group | III |
| Marine pollutant | Cyhalofop-butyl |
| 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 | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Cyhalofop-butyl) |
| UN number | UN 3082 |
| Class | 9 |
| Packing group | III |

Hazchem Code: ●2X

Further information:

Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082 are not subject to the Australian Code for the Transport of Dangerous Goods (ADG). This applies when transported by road or rail in packaging's that do not incorporate a receptacle exceeding 500 kg(L) or IBCs per ADG Special Provision AU01.

Marine Pollutants in single or combination packaging containing a net quantity per single or inner packaging of 5 L or less for liquids or having a net mass per single or inner packaging of 5 KG or less for solids may be transported as non-dangerous goods as provided in section 2.10.2.7 of IMDG code and IATA special provision A197.

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.

SECTION 15: REGULATORY INFORMATION

Poison Schedule: S5

APVMA Approval Number: 58613

Australia Inventory of Chemical Substances (AICS)

The product is used in a biocide/pesticide application and is subject to the applicable regulation. It contains a component exempt from inventory listing requirements. Because an intentional component of the product is not on the inventory, the product may only be used in the exempt application.

SECTION 16: ANY OTHER RELEVANT INFORMATION

Revision

Identification Number: 101190480/ A143 / Issue Date: 28.11.2019 / Replaces: 20.06.2016

DAS Code: GF-1272

Sections amended: 1, 14

Legend

| | |
|---------|---|
| ACGIH | USA. American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) |
| AU OEL | Australia. Workplace Exposure Standards for Airborne Contaminants. |
| Dow IHG | Dow Industrial Hygiene Guideline |
| SKIN | Absorbed via skin |
| STEL | Short term exposure limit |
| TWA | Time weighted average |

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