

Product name: Starane® Advanced Herbicide**Issue Date:** 5.09.2023

CORTEVA AGRISCIENCE AUSTRALIA PTY LTD 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. This Safety Data Sheet adheres to the standards and regulatory requirements of Australia and may not meet the regulatory requirements in other countries.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product name: Starane® Advanced Herbicide**Recommended use of the chemical and restrictions on use****Identified uses:** End use herbicide product**COMPANY IDENTIFICATION**

CORTEVA AGRISCIENCE AUSTRALIA PTY LTD
LEVEL 9, 67 ALBERT AVENUE
CHATSWOOD NSW 2067
AUSTRALIA

Customer Information Number:

1800-700-096

austomerservice@corteva.com

EMERGENCY TELEPHONE NUMBER**24-Hour 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: HAZARDS IDENTIFICATION

GHS Classification

Serious eye damage/eye irritation - Category 2A

Skin sensitisation - Category 1B

Specific target organ toxicity - single exposure - Category 3

Acute aquatic toxicity - Category 1

Chronic aquatic toxicity - Category 1

GHS label elements**Hazard pictograms**Signal word: **WARNING!**

Hazard statements

May cause an allergic skin reaction.
 Causes serious eye irritation.
 May cause respiratory irritation.
 Very toxic to aquatic life with long lasting effects.

Precautionary statements**Prevention**

Use only outdoors or in a well-ventilated area.
 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
 Wear protective gloves/ eye protection/ face protection.
 Wash skin thoroughly after handling.
 Avoid release to the environment.
 Contaminated work clothing should not be allowed out of the workplace.

Response

IF ON SKIN: Wash with plenty of soap and water.
 If skin irritation or rash occurs: Get medical advice/ attention.
 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 eye irritation persists: Get medical advice/ attention.
 Wash contaminated clothing before re-use.
 Collect spillage.

Storage

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

Disposal

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

Other hazards

No data available

SECTION 3: COMPOSITION AND INFORMATION

This product is a mixture.

Component	CASRN	Concentration
Fluroxypyr 1-methylheptyl ester	81406-37-3	45.52 %
Reaction mass of N,N-dimethyldecan-1-amide and N,N-dimethyloctanamide	Not available	30.0 - 40.0 %
Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts	68953-96-8	1 - 3 %
Hydrocarbons, C10, aromatics, <1% naphthalene	1189173-42-9	1 - 3 %
N-Methyl-2-pyrrolidone	872-50-4	0.1 – 0.3 %

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 centre or doctor for treatment advice.

Skin contact: Take off contaminated clothing. Wash skin with soap and plenty of water for 15-20 minutes. Call a poison control centre or doctor for treatment advice. Wash clothing before re-use. 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 centre or doctor for treatment advice. Suitable emergency eye wash facility should be available in work area.

Ingestion: No emergency medical treatment necessary.

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

Indication of any immediate medical attention and special treatment needed

Notes to physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data Sheet, and if available, the product container or label with you when calling a poison control centre or doctor or going for treatment. Skin contact may aggravate pre-existing dermatitis.

SECTION 5: FIREFIGHTING MEASURES

Hazchem code: ●3Z

Suitable extinguishing media: Water spray. Dry chemical. Carbon dioxide. Foam.

Unsuitable extinguishing media: Do not use direct water stream. May spread fire.

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. Carbon oxides.

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: Evacuate area. 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 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. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

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.

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. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: If the product contaminates rivers and lakes or drains inform respective authorities. Prevent spreading over a wide area (e.g. by containment or oil barriers). 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 labeled containers. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, recovered material should be stored in a vented container. The vent must prevent the ingress of water as further reaction with spilled materials can take place which could lead to over-pressurisation of the container. Keep in suitable, closed containers for disposal. Wipe up with absorbent material (e.g. cloth, fleece). Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Avoid formation of aerosol. Provide sufficient air exchange and/or exhaust in work rooms. Handle in accordance with good industrial hygiene and safety practice. Avoid exposure - obtain special instructions before use. Smoking, eating and drinking should be prohibited in the application area. Do not get on skin or clothing. Do not breathe vapours or spray mist. Do not swallow. Do not get in eyes. Keep container tightly closed. Take care to prevent spills, waste and minimize release to the environment. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Conditions for safe storage: Store in a dry place. Store in closed original, properly labelled container. Keep container tightly closed when not in use. Do not store near acids, strong oxidising agents, 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
Fluroxypyr 1-methylheptyl ester	Dow IHG	TWA	10 mg/m ³
N-Methyl-2-pyrrolidone	AU OEL	STEL	309 mg/m ³ 75 ppm SKIN
	AU OEL	TWA	103 mg/m ³ 25 ppm SKIN

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
N-methyl-2-pyrrolidone	872-50-4	5-Hydroxy-N-methyl-2-pyrrolidone	Urine	End of shift (As soon as possible after exposure ceases)	100 mg/l	ACGIH BEI

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 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.

Individual protection measures

Eye/face protection: Use chemical goggles.

Skin protection

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. 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: Butyl rubber. Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. 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, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator.

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: Recommended practices for occupational eye protection.

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 to brown
Odour	Spicy
Odour Threshold	No test data available
pH	4.58 1% <i>ASTM E70</i>
Melting point/range	No applicable
Freezing point	No test data available
Boiling point (760 mmHg)	No test data available
Flash point – closed cup	> 100 °C <i>ASTM D3278</i>
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammability (solid, gas)	Not applicable to liquids
Lower explosion limit	No test data available
Upper explosion limit	No test data available
Vapour Pressure	No test data available
Relative Vapour Density (air = 1)	No test data available
Relative Density (water = 1)	1.05 g/cm ³ (20 °C). <i>OECD 109</i>
Water solubility	Emulsifiable
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	358 °C <i>EC Method A15</i>
Decomposition temperature	No test data available
Dynamic Viscosity	28.2 mPa.s at 40 °C <i>OECD 114</i>
Kinematic Viscosity	No test data available
Explosive properties	No <i>EEC A14</i>
Oxidizing properties	No significant increase (>5C) in temperature.

Liquid Density	1.05 g/cm ³ at 20 °C <i>OECD 109</i>
Molecular weight	No test data available
Surface tension	32 mN/m at 25 °C <i>EC Method A5</i>

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

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Not classified as a reactivity hazard.

Chemical stability: Unstable at elevated temperatures. No decomposition if stored and applied as directed.

Possibility of hazardous reactions: Stable under recommended storage conditions.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible materials: Strong acids. Strong bases.

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: Nitrogen oxides. Carbon oxides. Toxic gases are released during decomposition.

SECTION 11: TOXICOLOGICAL INFORMATION

Acute toxicity

Acute oral toxicity

Product: LD₅₀, Rat, female > 5,000 mg/kg. No deaths occurred at this concentration. OECD Test Guideline 425. Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

Fluroxypyr 1-methylheptyl ester: LD₅₀ (Rat): > 2,000 mg/kg. No deaths occurred at this concentration.

The substance has no acute oral toxicity

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: LD₅₀ (Rat): > 2,000 mg/kg

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts: For similar material(s): LD₅₀ (Rat, male and female), > 2,000 mg/kg. No deaths occurred at this concentration. The substance has no acute oral toxicity. OECD 401 or equivalent.

Hydrocarbons, C10, aromatics, <1% naphthalene: For similar material(s): LD₅₀ (Rat): > 5,000 mg/kg.

N-methyl-2-pyrrolidone: LD₅₀ (Rat, male and female): 4,150 mg/kg. OECD Test Guideline 401

Acute inhalation toxicity

Product: LC₅₀, Rat, male and female, 4 Hour, dust/mist, > 5.50 mg/L. OECD Test Guideline 403.

The mixture has no acute inhalation toxicity. No adverse effects are anticipated from single exposure to mist. Mist may cause irritation of upper respiratory tract (nose and throat).

Fluroxypyr 1-methylheptyl ester: LD₅₀ (Rat): LC₅₀ (Rat, male and female), 4 hour, dust/mist > 1.16 mg/L. Maximum attainable concentration. No deaths occurred at this concentration. The substance has no acute inhalation toxicity.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: LC50 (Rat), 4 hour, dust/mist > 3.551 mg/L. The mixture has no acute inhalation toxicity.

Hydrocarbons, C10, aromatics, <1% naphthalene: For similar material(s): LC50 (Rat): 4 hour, vapour > 4.688 mg/L. Maximum attainable concentration. The substance has no acute inhalation toxicity.

N-methyl-2-pyrrolidone: LC50 (Rat, male and female): 4 hour, dust/mist > 5.1 mg/L. OECD Test Guideline 403. No deaths occurred at this concentration.

Acute dermal toxicity

Product: LD50, Rat, male and female > 5,000 mg/kg. No deaths occurred at this concentration. OECD Test Guideline 402. Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Fluroxypyr 1-methylheptyl ester: LD50 (Rabbit): > 2,000 mg/kg. No deaths occurred at this concentration. The substance has no acute dermal toxicity.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: LD50 (Rat): > 2,000 mg/kg
Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts: For similar material(s): LD50 (Rat, male and female): 1,000 - 1,600 mg/kg. OECD 402 or equivalent.

Hydrocarbons, C10, aromatics, <1% naphthalene: For similar material(s): LD50 (Rabbit): > 2,000 mg/kg. The substance has no acute dermal toxicity.

N-methyl-2-pyrrolidone: LD50 (Rat, male and female): > 5,000 mg/kg. OECD Test Guideline 402

Skin corrosion/irritation

Product: Rabbit. Draize test: No skin irritation.

Fluroxypyr 1-methylheptyl ester: Rabbit. No skin irritation.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: Rabbit. Skin irritation.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts: Rabbit. Skin irritation.

N-methyl-2-pyrrolidone: Rabbit. Skin irritation.

Serious eye damage/eye irritation

Product: Rabbit. Eye irritation. OECD Test Guideline 405.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: Rabbit. Corrosive.

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

N-methyl-2-pyrrolidone: Rabbit. Eye irritation.

Sensitization

Product: Local lymph node assay (LLNA). Mouse. OECD Test Guideline 429. The product is a skin sensitizer, sub-category 1B.

Fluroxypyr 1-methylheptyl ester: Guinea pig. Does not cause skin sensitisation.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: For similar material(s): Guinea pig. Does not cause skin sensitisation.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts: For similar material(s): For skin sensitisation. Did not cause allergic skin reactions when tested in guinea pigs.

Hydrocarbons, C10, aromatics, <1% naphthalene: For similar material(s): For similar material(s): For skin sensitisation. Did not cause allergic skin reactions when tested in guinea pigs.

N-methyl-2-pyrrolidone: Guinea pig. Does not cause skin sensitisation.

Specific Target Organ Systemic Toxicity (Single Exposure)

Product: May cause respiratory irritation.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: May cause respiratory irritation via inhalation.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts: Available data are inadequate to determine single exposure specific target organ toxicity.

Hydrocarbons, C10, aromatics, <1% naphthalene: May cause drowsiness or dizziness via inhalation.

N-methyl-2-pyrrolidone: May cause respiratory tract irritation via inhalation.

Specific Target Organ Systemic Toxicity (Repeated Exposure)

Product: Evaluation of available data suggests that this material is not an STOT-RE toxicant.

Fluroxypyr 1-methylheptyl ester: Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: For similar material(s):

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

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts: In animals, effects have been reported on the following organs: Kidney.

Hydrocarbons, C10, aromatics, <1% naphthalene: Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

N-methyl-2-pyrrolidone: Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Carcinogenicity

Fluroxypyr 1-methylheptyl ester: For similar material(s): Did not cause cancer in laboratory animals.

Hydrocarbons, C10, aromatics, <1% naphthalene: Contains naphthalene which has caused cancer in some laboratory animals. However, the relevance of this to humans is unknown.

N-methyl-2-pyrrolidone: Did not cause cancer in laboratory animals.

Reproductive toxicity

Product: No toxicity to reproduction.

Fluroxypyr 1-methylheptyl ester: Has been toxic to the foetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: For similar material(s): Did not cause birth defects or any other foetal effects in laboratory animals.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts: For similar material(s): In animal studies, did not interfere with reproduction. Did not cause birth defects or any other foetal effects in laboratory animals.

Hydrocarbons, C10, aromatics, <1% naphthalene: For similar material(s): In animal studies, did not interfere with reproduction. Did not cause birth defects or any other foetal effects in laboratory animals.

N-methyl-2-pyrrolidone: Clear evidence of adverse effects on development, based on animal experiments. N-methyl pyrrolidone has caused toxic effects to the foetus in laboratory animals at high dose levels with either mild or undetectable maternal toxicity.

Germ cell mutagenicity

Product: In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Fluroxypyr 1-methylheptyl ester: In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: In vitro genetic toxicity studies were negative.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts: For similar material(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Hydrocarbons, C10, aromatics, <1% naphthalene: For similar material(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

N-methyl-2-pyrrolidone: In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were negative.

Aspiration Hazard

Product: No aspiration toxicity classification.

Fluroxypyr 1-methylheptyl ester: Based on physical properties, not likely to be an aspiration hazard.

Reaction mass N,N-dimethyldecanamide & N,N-dimethyloctanamide: May be harmful if swallowed and enters airways.

Benzenesulfonic acid, mono-C11-13-branched alkyl derivs., calcium salts: Based on physical properties, not likely to be an aspiration hazard.

Hydrocarbons, C10, aromatics, <1% naphthalene: May be fatal if swallowed and enters airways.

N-methyl-2-pyrrolidone: Based on physical properties, not likely to be an aspiration hazard.

SECTION 12: ECOLOGICAL INFORMATION

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

Ecotoxicity

Product:

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).

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 14.3 mg/l Exposure time: 96 h Test Type: flow-through test Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 20 mg/l Exposure time: 48 h Test Type: static test Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 9.6 mg/l End point: Growth rate inhibition Exposure time: 72 h Test Type: static test Method: OECD Test Guideline 201 ErC50 (Myriophyllum spicatum): 0.178 mg/l Exposure time: 14 d Test Type: static test Method: OECD Test Guideline 201 NOEC (Myriophyllum spicatum): 0.0152 mg/l Exposure time: 14 d Test Type: static test Method: OECD Test Guideline 201
Toxicity to soil dwelling organisms	:	LC50 (Eisenia fetida (earthworms)): > 1,000 mg/kg Exposure time: 14 d End point: survival Method: OECD Test Guideline 207
Material is practically non-toxic to birds on an acute basis (LD50 > 2,000 mg/kg).		
Toxicity to terrestrial organisms	:	oral LD50 (Colinus virginianus (Bobwhite quail)): > 2,250 mg/kg

Ecotoxicology Assessment

- Acute aquatic toxicity : Very toxic to aquatic life.
- Chronic aquatic toxicity : Very toxic to aquatic life with long lasting effects.

Components:**Fluroxypyr 1-methylheptyl ester:**

- 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)): > 0.225 mg/l
Exposure time: 96 h
Test Type: semi-static test
Method: OECD Test Guideline 203 or Equivalent
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 0.183 mg/l
Exposure time: 48 h
Test Type: semi-static test
Method: OECD Test Guideline 202 or Equivalent
- Toxicity to algae/aquatic plants : ErC50 (diatom Navicula sp.): 0.24 mg/l
Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201 or Equivalent
- EbC50 (alga Scenedesmus sp.): > 0.47 mg/l
Exposure time: 72 h
- ErC50 (Selenastrum capricornutum (green algae)): > 1.410 mg/l
Exposure time: 96 h
- ErC50 (Myriophyllum spicatum): 0.075 mg/l
Exposure time: 14 d
- NOEC (Myriophyllum spicatum): 0.031 mg/l
Exposure time: 14 d
- Toxicity to fish (Chronic toxicity) : NOEC (Rainbow trout (Oncorhynchus mykiss)): 0.32 mg/l
- Toxicity to soil dwelling organisms : LC50 (Eisenia fetida (earthworms)): > 1,000 mg/kg
- Toxicity to terrestrial organisms : Material is practically non-toxic to birds on an acute basis (LD50 > 2,000 mg/kg). Material is practically non-toxic to birds on a dietary basis (LC50 > 5,000 ppm).
- oral LD50 (Colinus virginianus (Bobwhite quail)): > 2,000 mg/kg bodyweight.
Exposure time: 5 d
- dietary LC50 (Colinus virginianus (Bobwhite quail)): > 5,000 mg/kg diet.

oral LD50 (Apis mellifera (bees)): > 100 micrograms/bee
Exposure time: 48 h

contact LD50 (Apis mellifera (bees)): > 100 micrograms/bee
Exposure time: 48 h

Reaction mass of N,N-dimethyldecan-1-amide and N,N-dimethyloctanamide:

- Toxicity to fish : Material is toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).
- LC50 (Brachydanio rerio (zebra fish)): 14.8 mg/l
Exposure time: 96 h
- Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): 7.7 mg/l
Exposure time: 48 h
- Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (green algae)): 16.06 mg/l
Exposure time: 72 h

Ecotoxicology Assessment

- Acute aquatic toxicity : Toxic to aquatic life.

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

- 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)): 31.6 mg/l
Exposure time: 96 h
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 62 mg/l
Exposure time: 48 h
- Toxicity to algae/aquatic plants : For similar material(s): ErC50 (Selenastrum capricornutum (green algae)): 29 mg/l
End point: Growth rate inhibition
Exposure time: 96 h
- Toxicity to fish (Chronic toxicity) : For similar material(s): NOEC (Rainbow trout (Salmo gairdneri)): 0.23 mg/l
End point: survival
Exposure time: 72 d
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : For similar material(s): NOEC (Daphnia magna (Water flea)): 1.18 mg/l
End point: number of offspring
Exposure time: 21 d

Toxicity to microorganisms : For similar material(s): EC50 (activated sludge): 550 mg/l
End point: Respiration rates.
Exposure time: 3 h

Hydrocarbons, C10, aromatics, <1% naphthalene:

Toxicity to fish : For similar material(s): Material is toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

For similar material(s): LC50 (Oncorhynchus mykiss (rainbow trout)): 2 - 5 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : For similar material(s): EC50 (Daphnia magna): 3 - 10 mg/l
Exposure time: 48 h

Toxicity to algae/aquatic plants : For similar material(s): EC50 (Pseudokirchneriella subcapitata (green algae)): 11 mg/l
Exposure time: 72 h

Ecotoxicology Assessment

Chronic aquatic toxicity : Toxic to aquatic life with long lasting effects.

N-methyl-2-pyrrolidone:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): > 5,000 mg/l
Exposure time: 96 h
Test Type: static test

LC50 (Pimephales promelas (fathead minnow)): 1,072 mg/l
Exposure time: 96 h
Test Type: static test

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 1,000 mg/l
Exposure time: 24 h
Test Type: static test
Method: OECD Test Guideline 202 or Equivalent

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): > 500 mg/l
End point: Growth rate inhibition
Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201 or Equivalent

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 12.5 mg/l
Exposure time: 21 d
Test Type: semi-static test
Method: OECD Test Guideline 211 or Equivalent

Persistence and degradability**Fluroxypyr 1-methylheptyl ester:**

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

Biodegradation: 32 %
Exposure time: 28 d
Method: OECD Test Guideline 301D or Equivalent
10-day Window: Fail

ThOD : 2.2 kg/kg

Stability in water : Test Type: Hydrolysis
Degradation (half-life): 454 d

Reaction mass of N,N-dimethyldecan-1-amide and N,N-dimethyloctanamide:

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

Result: Readily biodegradable.
Biodegradation: > 80 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent
10-day Window: Pass

Chemical Oxygen Demand (COD) : 2.890 mg/g

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

Biodegradability : Biodegradation: 2.9 %
Exposure time: 28 d
Method: OECD Test Guideline 301E or Equivalent
10-day Window: Fail

Hydrocarbons, C10, aromatics, <1% naphthalene:

Biodegradability : Material is inherently biodegradable (reaches > 20% biodegradation in OECD test(s) for inherent biodegradability).

N-methyl-2-pyrrolidone:

Biodegradability : Readily biodegradable.
Biodegradation: 91 %
Exposure time: 28 d
Method: OECD Test Guideline 301B or Equivalent
10-day Window: Pass

Concentration: 30 mg/l
Biodegradation: 73 %
Exposure time: 28 d
Method: OECD Test Guideline 301C or Equivalent
10-day Window: Not applicable

Biodegradation: > 90 %
 Exposure time: 8 d
 Method: OECD Test Guideline 302B or Equivalent
 10-day Window: Not applicable

ThOD : 2.58 kg/kg

Photodegradation : Test Type: Half-life (indirect photolysis)
 Sensitiser: OH radicals
 Rate constant: 2.199E-11 cm³/s
 Method: Estimated.

Bioaccumulative potential

Fluroxypyr 1-methylheptyl ester:

Bioaccumulation : Species: Oncorhynchus mykiss (rainbow trout)
 Bioconcentration factor (BCF): 26
 Method: Measured

Partition coefficient: n-octanol/water :
 log Pow: 5.04
 Method: Measured
 Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Reaction mass of N,N-dimethyldecan-1-amide and N,N-dimethyloctanamide:

Partition coefficient: n-octanol/water : log Pow: < 3.44 (20 °C)
 Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

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

Partition coefficient: n-octanol/water : log Pow: 4.6
 Method: OECD Test Guideline 107 or Equivalent
 Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

Hydrocarbons, C10, aromatics, <1% naphthalene:

Partition coefficient: n-octanol/water : No data available for this product.
 For similar material(s): Bioconcentration potential is high (BCF > 3,000 or Log Pow between 5 and 7).

N-methyl-2-pyrrolidone:

Partition coefficient: n-octanol/water : log Pow: -0.38
 Method: Measured
 Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Mobility in soil**Fluroxypyr 1-methylheptyl ester:**

Distribution among environmental compartments : Koc: 6,200 – 43,000
Expected to be relatively immobile in soil (Koc > 5,000).

Reaction mass of N,N-dimethyldecan-1-amide and N,N-dimethyloctanamide:

Distribution among environmental compartments : Koc: 527.3
Potential for mobility in soil is low (Koc between 500 and 2,000).

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

Distribution among environmental compartments : No relevant data found.

Hydrocarbons, C10, aromatics, <1% naphthalene:

Distribution among environmental compartments : No relevant data found.

N-methyl-2-pyrrolidone:

Distribution among environmental compartments : Koc: 21
Method: Estimated.
Potential for mobility in soil is very high (Koc between 0 and 50).
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.

Other adverse effects**Fluroxypyr-meptyl (ISO):**

Results of PBT and vPvB assessment : 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).

Ozone-Depletion Potential : This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Reaction mass of N,N-dimethyldecan-1-amide and N,N-dimethyloctanamide:

Results of PBT and vPvB assessment : 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).

Ozone-Depletion Potential : 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:

Results of PBT and vPvB assessment : 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).

Ozone-Depletion Potential : This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Hydrocarbons, C10, aromatics, <1% naphthalene:

Results of PBT and vPvB assessment : 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).

Ozone-Depletion Potential : This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

N-methyl-2-pyrrolidone:

Results of PBT and vPvB assessment : 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).

Ozone-Depletion Potential : This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

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

ADG

Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fluroxypyr 1-methylheptyl ester)
UN number	UN 3082
Class	9
Packing group	III
Marine pollutant	Fluroxypyr

Classification for SEA transport (IMO-IMDG):

Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fluroxypyr 1-methylheptyl ester)
UN number	UN 3082
Class	9

Packing group	III
Marine pollutant	Fluroxypyr
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. (Fluroxypyr 1-methylheptyl ester)
UN number	UN 3082
Class	9
Packing group	III

Hazchem code: ●3Z

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.

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

15. REGULATORY INFORMATION

Poison Schedule: None allocated
APVMA Approval Number: 62287

16. OTHER INFORMATION

Revision

Identification Number: 101188173 / A143 / Issue Date: 05.09.2023 / Replaces: 15.09.2021

DAS code: GF-1784

Sections amended: 14

Legend

AU OEL	Australia. Workplace Exposure Standards for Airborne Contaminants.
Dow IHG	Dow Industrial Hygiene Guideline
SKIN	Absorbed via skin
STEL	Exposure standard – short term exposure limit
TWA	Exposure standard - time weighted average
US WEEL	Workplace Environmental Exposure Levels (WEEL)

Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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