SAFETY DATA SHEET
CORTEVA AGRISCIENCE CANADA COMPANY

Product name: REZUVANT XL HERBICIDE **Issue Date:** 02/26/2021

CORTEVA AGRISCIENCE CANADA COMPANY 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.

1. IDENTIFICATION

Product name: REZUVANT XL HERBICIDE

Recommended use of the chemical and restrictions on use
Identified uses: End use herbicide product

COMPANY IDENTIFICATION
CORTEVA AGRISCIENCE CANADA COMPANY
#2450, 215 - 2ND STREET S.W.
CALGARY AB, T2P 1M4
CANADA

Customer Information Number	:	800-667-3852
E-mail address	:	solutions@corteva.com

EMERGENCY TELEPHONE

24-Hour Emergency Contact	:	1-888-226-8832
Local Emergency Contact	:	1-888-226-8832

2. HAZARDS IDENTIFICATION

Hazard classification
This product is hazardous under the criteria of the Hazardous Products Regulation (HPR) as implemented under the Workplace Hazardous Materials Information System (WHMIS 2015).
Flammable liquids - Category 4
Skin sensitization - Category 1
Carcinogenicity - Category 2
Reproductive toxicity - Category 2
Specific target organ toxicity - single exposure - Category 3
Aspiration hazard - Category 1

Label elements
Hazard pictograms

Signal Word: **DANGER!**

Hazards
Combustible liquid.
May be fatal if swallowed and enters airways.
May cause an allergic skin reaction.
May cause drowsiness or dizziness.
Suspected of causing cancer.
Suspected of damaging fertility or the unborn child.

Precautionary statements

Prevention
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing should not be allowed out of the workplace.
Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response
IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
IF ON SKIN: Wash with plenty of water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
IF exposed or concerned: Get medical advice/ attention.
Do NOT induce vomiting.
If skin irritation or rash occurs: Get medical advice/ attention.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

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

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

Other hazards
No data available
Further information
The values listed below represent the percentages of ingredients of unknown toxicity.
The following percentage of the mixture consists of ingredient(s) with unknown acute toxicity: 1.2544 %

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CASRN	Concentration
Fluroxypyr 1-methylheptyl ester	81406-37-3	15.32%
Pinoxaden	243973-20-8	5.1%
Cloquintocet-mexyl	99607-70-2	1.28%

Halauxifen-methyl	943831-98-9	0.44%
Heavy aromatic naphtha	64742-94-5	>= 10.0 - < 20.0 %
Hexylene glycol	107-41-5	>= 10.0 - < 20.0 %
Ethylhexanol	104-76-7	>= 1.0 - < 3.0 %
Naphthalene	91-20-3	>= 0.1 - < 0.3 %
Balance	Not available	> 40.0 %

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 effects occur, consult a physician.

Skin contact: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.

Eye contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

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.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Water spray Alcohol-resistant foam Carbon dioxide (CO2)

Unsuitable extinguishing media: Do not use direct water stream. High volume water jet

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: Carbon oxides

Unusual Fire and Explosion Hazards: Exposure to combustion products may be a hazard to health. Vapours may form explosive mixtures with air. Do not allow run-off from fire fighting to enter drains or water courses. Flash back possible over considerable distance.

Advice for firefighters
Fire Fighting Procedures: Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Do not use a solid water stream as it may scatter and spread fire. Use a water spray to cool fully closed containers. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Remove undamaged containers from fire area if it is safe to do so. Evacuate area. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Ensure adequate ventilation. Use personal protective equipment. 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. Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained. Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Clean up remaining materials from spill with suitable absorbant. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in. 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 overpressurization of the container. Keep in suitable, closed containers for disposal. Wipe up with absorbent material (e.g. cloth, fleece). Non-sparking tools should be used. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Suppress (knock down) gases/vapours/mists with a water spray jet. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Avoid formation of aerosol. Persons susceptible to skin sensitisation problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used. Provide sufficient air exchange and/or exhaust in work rooms. Do not breathe vapours/dust. Do not smoke. 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. Avoid inhalation of vapour or mist. Do not swallow. Avoid contact with skin and eyes. Avoid contact with eyes. Keep container tightly closed. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. 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.
Use with local exhaust ventilation.

Conditions for safe storage: Store in a closed container. No smoking. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep in properly labelled containers. Store in accordance with the particular national regulations.

Do not store with the following product types: Do not store near acids.. Strong oxidizing agents. Explosives. Gases.
Unsuitable materials for containers**:** None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Consult local authorities for recommended exposure limits.

Component	Regulation	Type of listing	Value/Notation
Fluroxypyr 1-methylheptyl ester	Dow IHG	TWA	10 mg/m3
Heavy aromatic naphtha	ACGIH	TWA	200 mg/m3 , total hydrocarbon vapor
	Corteva OEL	TWA	100 mg/m3
	Corteva OEL	STEL	300 mg/m3
	CA AB OEL	TWA	200 mg/m3 , total hydrocarbon vapor
Hexylene glycol	ACGIH	TWA Vapor and aerosol	25 ppm
	ACGIH	TWA Vapour	25 ppm
	ACGIH	STEL Vapor and aerosol	50 ppm
	ACGIH	STEL Vapour	50 ppm
	ACGIH	STEL Aerosol only	10 mg/m3
	ACGIH	STEL Inhalable fraction, Aerosol only	10 mg/m3
	Dow IHG	STEL Aerosol	10 mg/m3
	Dow IHG	TLV-C Vapour	25 ppm
	CA AB OEL	(c)	121 mg/m3 25 ppm
	CA BC OEL	C	25 ppm
	CA ON OEL	CEV	120 mg/m3 25 ppm
	CA QC OEL	C	121 mg/m3 25 ppm
Ethylhexanol	Corteva OEL	TWA	2 ppm SKIN

Naphthalene	ACGIH	TWA		10 ppm
	CA AB OEL	TWA	52 mg/m3	10 ppm
	CA AB OEL	STEL	79 mg/m3	15 ppm
	CA BC OEL	TWA		10 ppm
	CA BC OEL	STEL		15 ppm
	CA QC OEL	TWAEV	52 mg/m3	10 ppm
	CA QC OEL	STEV	79 mg/m3	15 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 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 safety glasses (with side shields).

Skin protection

Hand protection: Use gloves chemically resistant to this material. 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. 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. For most conditions no respiratory protection should be needed; however, if discomfort is experienced, use an approved air-purifying respirator.
The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	Liquid
Color	yellow
Odor	Solvent
Odor Threshold	No data available
pH	4.80
Melting point/range	Not applicable
Freezing point	No data available
Boiling point (760 mmHg)	No data available
Flash point	**closed cup** 80 °C

Evaporation Rate (Butyl Acetate = 1)	No data available
Flammability (solid, gas)	Not Applicable
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapor Pressure	No data available
Relative Vapor Density (air = 1)	No data available
Relative Density (water = 1)	No data available
Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Dynamic Viscosity	31.7 mPa.s at 20 °C 14.2 mPa.s at 40 °C
Kinematic Viscosity	No data available
Explosive properties	No
Oxidizing properties	No data available
Liquid Density	0.9785 g/ml at 20 °C
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: Not classified as a reactivity hazard.

Chemical stability: No decomposition if stored and applied as directed. Stable under normal conditions.

Possibility of hazardous reactions: Vapours may form explosive mixture with air. May form explosive dust-air mixture.
No hazards to be specially mentioned.

Conditions to avoid: Heat, flames and sparks.

Incompatible materials: None.

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 oxides

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.

As product:
LD50, Rat, female, > 5,000 mg/kg OECD Test Guideline 423 No deaths occurred at this concentration.

Acute dermal toxicity
Prolonged skin contact is unlikely to result in absorption of harmful amounts.
As product: The dermal LD50 has not been determined.

Acute inhalation toxicity
No adverse effects are anticipated from single exposure to mist.

As product:
LC50, Rat, male and female, 4 Hour, dust/mist, 8.4 mg/l OECD Test Guideline 403 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 slight temporary eye irritation.
May cause corneal injury.

Sensitization
For skin sensitization:
As product:
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)
Based on information for component(s):
In animals, effects have been reported on the following organs:
Thymus.
Kidney.
Liver.
Thyroid.
Excessive exposure may cause hemolysis, thereby impairing the blood's ability to transport oxygen.
Cataracts and other eye effects have been reported in humans repeatedly exposed to naphthalene vapor or dust.

Carcinogenicity
For the active ingredient(s): Did not cause cancer in laboratory animals.

Based on information for component(s): 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.

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.

Reproductive toxicity
For the active ingredient(s): In animal studies, has been shown to interfere with reproduction.

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

Aspiration Hazard
May be fatal if swallowed and enters airways.

COMPONENTS INFLUENCING TOXICOLOGY:

Fluroxypyr 1-methylheptyl ester

Acute dermal toxicity
LD50, Rabbit, > 2,000 mg/kg No deaths occurred at this concentration.

Pinoxaden

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

LD50, Rat, male and female, > 2,000 mg/kg OECD Test Guideline 402 No deaths occurred at this concentration.

Cloquintocet-mexyl

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

Halauxifen-methyl

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

Heavy aromatic naphtha

Acute dermal toxicity
The dermal LD50 has not been determined.

For similar material(s): LD50, Rabbit, > 3,160 mg/kg

Hexylene glycol

Acute dermal toxicity
LD50, Rabbit, 13,200 mg/kg

Ethylhexanol

Acute dermal toxicity
LD50, Rabbit, > 3,000 mg/kg OECD Test Guideline 402

Naphthalene

Acute dermal toxicity
Human case reports suggest Naphthalene may be absorbed through the skin in toxic amounts, especially in children. LD50, Rat, > 2,500 mg/kg

Balance

Acute dermal toxicity
The dermal LD50 has not been determined.

Carcinogenicity

Component	**List**	**Classification**
Heavy aromatic naphtha	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

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

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, Selenastrum capricornutum (green algae), 96 Hour, > 1.410 mg/l
ErC50, Myriophyllum spicatum, 14 d, 0.075 mg/l
NOEC, Myriophyllum spicatum, 14 d, 0.031 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

Pinoxaden

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, Oncorhynchus mykiss (rainbow trout), flow-through, 96 Hour, 10.3 mg/l, OECD Test Guideline 203
LC50, Pimephales promelas (fathead minnow), flow-through, 96 Hour, 20 mg/l, OECD Test Guideline 203
LC50, Cyprinodon variegatus (sheepshead minnow), flow-through, 96 Hour, > 16 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), flow-through test, 48 Hour, 52 mg/l, OECD Test Guideline 202
LC50, Americamysis bahia (mysid shrimp), flow-through test, 96 Hour, 8.3 mg/l, US EPA Test Guideline OPPTS 850.1035

EC50, Oyster, Crassostrea virginica, flow-through test, 96 Hour, 0.40 mg/l, US EPA Test Guideline OPPTS 850.1035
LC50, Oyster, Crassostrea virginica, flow-through test, 96 Hour, > 0.88 mg/l, US EPA Test Guideline OPPTS 850.1035

Acute toxicity to algae/aquatic plants
ErC50, Pseudokirchneriella subcapitata (green algae), 48 Hour, 41 mg/l, OECD Test Guideline 201
ErC50, Skeletonema costatum (Diatom), Static, 72 Hour, 0.80 mg/l, OECD Test Guideline 201

Chronic toxicity to fish
NOEC, Pimephales promelas (fathead minnow), flow-through, 32 d, 1 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna, semi-static test, 21 d, 6.25 mg/l

Cloquintocet-mexyl

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).
As the ester active substance.
LC50, Oncorhynchus mykiss (rainbow trout), flow-through test, 96 Hour, > 0.97 mg/l, Method Not Specified.

Acute toxicity to aquatic invertebrates
As the ester active substance.
EC50, Daphnia magna (Water flea), flow-through test, 48 Hour, > 0.82 mg/l, Method Not Specified.

Acute toxicity to algae/aquatic plants
As the ester active substance.
EbC50, alga Scenedesmus sp., 96 Hour, Biomass, 0.63 mg/l, Method Not Specified.
As the ester active substance.
EbC50, Lemna minor (duckweed), 14 d, Biomass, > 0.42 mg/l, Method Not Specified.

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), > 2000mg/kg bodyweight.
dietary LC50, Anas platyrhynchos (Mallard duck), 8 d, > 5200mg/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

Halauxifen-methyl

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, Rainbow trout (Oncorhynchus mykiss), static test, 96 Hour, 2.01 mg/l
LC50, Pimephales promelas (fathead minnow), 96 Hour, > 3.22 mg/l

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), static test, 48 Hour, 2.12 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants
The EC50 value is above the water solubility.
ErC50, Pseudokirchneriella subcapitata (green algae), 96 Hour, > 3.0 mg/l
ErC50, Myriophyllum spicatum, 14 d, Growth rate inhibition, 0.000393 mg/l

Toxicity to bacteria
EC50, activated sludge, 1 d, > 981 mg/l

Chronic toxicity to fish
NOEC, Pimephales promelas (fathead minnow), flow-through test, Other, 0.259 mg/l
NOEC, Cyprinodon variegatus (sheepshead minnow), flow-through test, 36 d, 0.00272 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 0.484 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).
dietary LC50, Colinus virginianus (Bobwhite quail), 5 d, > 5,620 ppm
dietary LC50, Anas platyrhynchos (Mallard duck), 5 d, > 5,620 ppm
oral LD50, Colinus virginianus (Bobwhite quail), mortality, > 2250mg/kg bodyweight.
contact LD50, Apis mellifera (bees), 48 Hour, mortality, > 98.1µg/bee
oral LD50, Apis mellifera (bees), 48 Hour, mortality, > 108µg/bee

Toxicity to soil-dwelling organisms
LC50, Eisenia fetida (earthworms), 14 d, mortality, > 1,000 mg/kg

Heavy aromatic naphtha

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).
For similar material(s):
LC50, Oncorhynchus mykiss (rainbow trout), 96 Hour, 2 - 5 mg/l

Acute toxicity to aquatic invertebrates
For similar material(s):
EC50, Daphnia magna (Water flea), 48 Hour, 3 - 10 mg/l

Acute toxicity to algae/aquatic plants
For similar material(s):
EC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, 11 mg/l

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

Hexylene glycol

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Oncorhynchus mykiss (rainbow trout), flow-through test, 96 Hour, 9,450 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna, 48 Hour, 3,200 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
ErC50, Selenastrum capricornutum (green algae), 72 Hour, Growth rate inhibition, > 429 mg/l, OECD Test Guideline 201

Toxicity to bacteria
EC50, Bacteria, 16 Hour, > 5,000 mg/l, hUCC

Ethylhexanol

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, Oncorhynchus mykiss (rainbow trout), 96 Hour, 32 - 37 mg/l
LC50, Fathead minnow (Pimephales promelas), 96 Hour, 28.2 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
LC50, Daphnia magna (Water flea), 48 Hour, 35.2 mg/l, OECD Test Guideline 202
EC50, Daphnia magna (Water flea), 48 Hour, 39 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
ErC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, Growth rate inhibition, 11.5 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
EC50, Bacteria, 16 Hour, 256 - 320 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

Balance

Acute toxicity to fish
No relevant data found.

Persistence and degradability

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)
Hydrolysis, half-life, 454 d

Pinoxaden
Biodegradability: No relevant data found.

Cloquintocet-mexyl
Biodegradability: No relevant data found.

Halauxifen-methyl
Biodegradability: For similar active ingredient(s). Halauxifen. 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: 7.7 %
Exposure time: 28 d
Method: OECD Test Guideline 310 or Equivalent

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

Hexylene glycol
Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
10-day Window: Pass
Biodegradation: 81 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent

Theoretical Oxygen Demand: 2.30 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	2 %
10 d	29 %
20 d	48 %

Ethylhexanol
Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).
10-day Window: Not applicable
Biodegradation: > 95 %
Exposure time: 5 d
Method: OECD Test Guideline 302B or Equivalent
10-day Window: Pass
Biodegradation: 68 %
Exposure time: 17 d
Method: OECD Test Guideline 301B or Equivalent

Theoretical Oxygen Demand: 2.95 mg/mg

Chemical Oxygen Demand: 2.70 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	26 - 70 %
10 d	75 - 81 %
20 d	86 - 87 %

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitization: OH radicals
Atmospheric half-life: 9.7 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)
Sensitization: OH radicals
Atmospheric half-life: 5.9 Hour
Method: Estimated.

Balance

Biodegradability: No relevant data found.

Bioaccumulative potential

Fluroxypyr 1-methylheptyl ester

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 5.04 Measured
Bioconcentration factor (BCF): 26 Oncorhynchus mykiss (rainbow trout) Measured

Pinoxaden

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient: n-octanol/water(log Pow): 3.2

Cloquintocet-mexyl

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient: n-octanol/water(log Pow): 5.3 Estimated.
Bioconcentration factor (BCF): 122 - 621 Fish

Halauxifen-methyl

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient: n-octanol/water(log Pow): 3.76
Bioconcentration factor (BCF): 233 Lepomis macrochirus (Bluegill sunfish) 42 d

Heavy aromatic naphtha

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

Hexylene glycol

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 0.58 Estimated.
Bioconcentration factor (BCF): 3 Calculated.

Ethylhexanol

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient: n-octanol/water(log Pow): 3.1 Measured

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): 3.4 OECD Test Guideline 107
Bioconcentration factor (BCF): 40 - 300 Fish 28 d Measured

Balance

Bioaccumulation: No relevant data found.

Mobility in soil

Fluroxypyr 1-methylheptyl ester

Expected to be relatively immobile in soil (Koc > 5000).
Partition coefficient (Koc): 6200 - 43000

Pinoxaden

No relevant data found.

Cloquintocet-mexyl

Expected to be relatively immobile in soil (Koc > 5000).
Partition coefficient (Koc): 38070 Estimated.

Halauxifen-methyl

Expected to be relatively immobile in soil (Koc > 5000).
Partition coefficient (Koc): 5684

Heavy aromatic naphtha

No relevant data found.

Hexylene glycol

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 1 Estimated.

Ethylhexanol

Potential for mobility in soil is low (Koc between 500 and 2000).
Partition coefficient (Koc): 800 Estimated.

Naphthalene

Potential for mobility in soil is low (Koc between 500 and 2000).
Partition coefficient (Koc): 664

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

TDG

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

Classification for SEA transport (IMO-IMDG):

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

Further information:
NOT REGULATED PER TDG EXEMPTION 1.45.1 FOR ROAD OR RAIL

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

National Fire Code of Canada
Class IIIA

Canadian Domestic Substances List (DSL)
This product contains chemical substance(s) exempt from CEPA DSL Inventory requirements. It is regulated as a pesticide subject to Pest Control Products Act (PCPA) requirements.

Pest Control Products Act
Pest Control Products Act (PCPA) Registration Number: 34045
Read the PCPA label, authorized under the Pest Control Products Act, prior to using or handling this pest control product.

This chemical is a pest control product registered by Health Canada Pest Management Regulatory Agency and is subject to certain labelling requirements under the Pest Control Products Act (PCPA). There are Canada-specific environmental requirements for handling, use, and disposal of this pest control product that are indicated on the label. These requirements differ from the classification criteria and hazard information required for GHS-consistent safety data sheets. Following is the hazard information required on the pest control products label:

PCPA Label Hazard Communications:
Read the label and booklet before using. Keep out of reach of children.

POTENTIAL SKIN SENSITIZER

This product is toxic to:
Aquatic organisms
Non-target terrestrial plants

16. OTHER INFORMATION

Hazard Rating System
NFPA

Health	Flammability	Instability
2	2	0

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

Legend

(c)	ceiling occupational exposure limit
ACGIH	USA. ACGIH Threshold Limit Values (TLV)
C	ceiling limit
CA AB OEL	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
CA BC OEL	Canada. British Columbia OEL
CA ON OEL	Canada. Ontario OELs
CA QC OEL	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
CEV	ceiling exposure value
Corteva OEL	Corteva Occupational Exposure Limit
Dow IHG	Dow Industrial Hygiene Guideline
SKIN	Absorbed via skin

STEL	Short term exposure limit
STEV	Short-term exposure value
TLV-C	Ceiling Limit Value
TWA	8-hour time weighted average
TWAEV	Time-weighted average exposure value

Full text of other abbreviations
AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; 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; HMIS - Hazardous Materials Identification System; 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; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; 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; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; 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

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.

CORTEVA AGRISCIENCE CANADA COMPANY 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.
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