

Product Name: Curtail* M Herbicide**Issue Date:** 2014.01.13

Dow AgroSciences Canada Inc. encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

Curtail* M Herbicide

COMPANY IDENTIFICATION

Dow AgroSciences Canada Inc.
A Subsidiary of The Dow Chemical Company
Suite 2100, 450 1st Street SW
Calgary, AB T2P 5H1
Canada

For MSDS updates and Product Information: 800-667-3852**Prepared By:** Prepared for use in Canada by EH&S, Hazard Communications.
Revision 2014.01.13**Customer Information Number:** 800-667-3852
solutions@dow.com**EMERGENCY TELEPHONE NUMBER****24-Hour Emergency Contact:** 613-996-6666
Local Emergency Contact: 613-996-6666

2. Hazards Identification

Emergency Overview**Color:** Yellow**Physical State:** Liquid**Odor:** Sweet**Hazards of product:**

CAUTION! Combustible liquid and vapor. May cause eye irritation. May cause skin irritation. May be harmful if inhaled. May cause central nervous system effects. May cause anesthetic effects. May be harmful if swallowed. Aspiration hazard. Can enter lungs and cause damage. Vapor explosion hazard. Vapors may travel a long distance; ignition and/or flash back may occur. Isolate area. Keep upwind of spill. Stay out of low areas. Toxic fumes may be released in fire situations. Highly toxic to fish and/or other aquatic organisms. Possible cancer hazard. May cause cancer based on animal data.

Potential Health Effects

Eye Contact: May cause moderate eye irritation. May cause slight temporary corneal injury. In humans, eye irritation resulted from brief (minutes) exposure to cyclohexanone vapor concentration of 50 ppm and above.

Skin Contact: Brief contact is essentially nonirritating to skin. Prolonged contact may cause skin irritation with local redness.

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

Inhalation: Prolonged excessive exposure to mist may cause adverse effects. May cause central nervous system effects. Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed. Excessive exposure may cause irritation to upper respiratory tract (nose and throat).

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

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

Effects of Repeated Exposure: For similar active ingredient(s): 2-methyl-4-chlorophenoxyacetic acid (MCPA). Blood. Kidney. Liver. Testes. Based on information for component(s): In animals, effects have been reported on the following organs: Blood. Central nervous system. Kidney. Liver. Respiratory tract.

Cancer Information: For the minor component(s): Has caused cancer in laboratory animals. However, the relevance of this to humans is unknown.

Birth Defects/Developmental Effects: Clopyralid caused birth defects in test animals, but only at greatly exaggerated doses that were severely toxic to the mothers. No birth defects were observed in animals given clopyralid at doses several times greater than those expected during normal exposure. For the active ingredient(s): MCPA-2-ethylhexyl. Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Based on information for component(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Has caused birth defects in lab animals only at doses producing severe toxicity in the mother.

Reproductive Effects: Based on information for component(s): In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Cyclohexanone caused reduced growth and survival of offspring in an animal reproduction study. Dose levels producing this effect also caused central nervous system effects in parental animals.

3. Composition/information on ingredients

Component	CAS #	Amount W/W
3,6-Dichloropicolinic acid (Clopyralid)	1702-17-6	4.94 %
MCPA 2-EHE: 2-Methyl-4-Chlorophenoxyacetic Acid 2-Ethylhexyl Ester	29450-45-1	43.16 %
Cyclohexanone	108-94-1	19.9 %
Solvent naphtha (petroleum), light aromatic consists of:	64742-95-6	19.4 %
1,2,4-Trimethylbenzene	95-63-6	5.8 %
1,3,5-Trimethylbenzene	108-67-8	1.5 %
Cumene	98-82-8	0.7 %
Xylene	1330-20-7	0.1 %
Balance	Not available	4.5 %

Amounts are presented as percentages by weight.

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. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

Eye Contact: Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. Call a poison control center or doctor for treatment advice. Suitable emergency eye wash facility should be available in work area.

Ingestion: Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

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

Indication of immediate medical attention and special treatment needed

Maintain adequate ventilation and oxygenation of the patient. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. The decision of whether to induce vomiting or not should be made by a 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 center or doctor, or going for treatment.

5. Fire Fighting Measures

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.

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 fluoride. 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. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Dense smoke is produced when product burns.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water.

Do not use direct water stream. May spread fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. 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.

See Section 9 for related Physical Properties

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Vapor explosion hazard. Keep out of sewers. Refer to Section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Spills or discharge to natural waterways is likely to kill aquatic organisms.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Pump with explosion-proof equipment. If available, use foam to smother or suppress. Small spills: Absorb with materials such as: Clay. Dirt. Sand. Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling

General Handling: Keep out of reach of children. Keep away from heat, sparks and flame. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor or mist. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. No smoking, open flames or sources of ignition in handling and storage area. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Electrically ground and bond all equipment. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Other Precautions: Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers.

Storage

Store in a dry place. Store in original container. Keep container tightly closed when not in use. Do not store near food, foodstuffs, drugs or potable water supplies. Minimize sources of ignition, such as static build-up, heat, spark or flame.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
3,6-Dichloropicolinic acid (Clopyralid)	Dow IHG	TWA	10 mg/m ³
Cyclohexanone	CAD AB OEL	TWA	80 mg/m ³ 20 ppm
	CAD BC OEL	TWA	20 ppm SKIN
	CAD BC OEL	STEL	50 ppm SKIN
	CAD ON OEL	TWAEV	20 ppm SKIN
	ACGIH	TWA	20 ppm SKIN
	ACGIH	STEL	50 ppm SKIN
	CAD ON OEL	STEV	50 ppm SKIN
	OEL (QUE)	TWA	100 mg/m ³ 25 ppm SKIN
	CAD AB OEL	STEL	200 mg/m ³ 50 ppm
	Dow IHG	TWA	7.5 ppm SKIN
1,2,4-Trimethylbenzene	CAD AB OEL	TWA	123 mg/m ³ 25 ppm
	CAD BC OEL	TWA	25 ppm
	CAD ON OEL	TWAEV	123 mg/m ³ 25 ppm
	ACGIH	TWA	25 ppm
	OEL (QUE)	TWA	123 mg/m ³ 25 ppm
1,3,5-Trimethylbenzene	CAD ON OEL	TWAEV	123 mg/m ³ 25 ppm
	ACGIH	TWA	25 ppm
	CAD AB OEL	TWA	123 mg/m ³ 25 ppm
	CAD BC OEL	TWA	25 ppm
	OEL (QUE)	TWA	123 mg/m ³ 25 ppm
Cumene	CAD AB OEL	TWA	246 mg/m ³ 50 ppm
	CAD BC OEL	TWA	25 ppm
	CAD BC OEL	STEL	75 ppm
	CAD ON OEL	TWAEV	50 ppm
	ACGIH	TWA	50 ppm
	OEL (QUE)	TWA	246 mg/m ³ 50 ppm

Consult local authorities for recommended exposure limits.

RECOMMENDATIONS IN THIS SECTION ARE FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS. APPLICATORS AND HANDLERS SHOULD SEE THE PRODUCT LABEL FOR PROPER PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING.

A "skin" notation following the inhalation exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.

It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

Personal Protection

Eye/Face Protection: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.

Skin Protection: Wear clean, body-covering clothing.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. Styrene/butadiene rubber. Examples of acceptable glove barrier materials

include: Nitrile/butadiene rubber (“nitrile” or “NBR”). Chlorinated polyethylene. Butyl rubber. Natural rubber (“latex”). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Use 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.

9. Physical and Chemical Properties

Appearance

Physical State	Liquid
Color	Yellow
Odor	Sweet
pH	2.8 <i>pH Electrode</i> (1% aqueous suspension)
Melting Point	Not applicable
Freezing Point	No test data available
Boiling Point (760 mmHg)	155 °C <i>Literature</i> (cyclohexanone)
Flash Point - Closed Cup	57.9 °C <i>Pensky-Martens Closed Cup ASTM D 93</i>
Flammable Limits In Air	Lower: No test data available Upper: No test data available
Vapor Pressure	10 mmHg @ 23.5 °C
Vapor Density (air = 1)	>1
Specific Gravity (H ₂ O = 1)	1.1432 20 °C/4 °C <i>Pyknometer</i>
Solubility in water (by weight)	forms an emulsion
Partition coefficient, n-octanol/water (log Pow)	No data available for this product. See Section 12 for individual component data.
Autoignition Temperature	No test data available
Decomposition Temperature	No test data available
Explosive properties	No test data available
Oxidizing properties	No test data available
Liquid Density	1.012 g/cm ³

10. Stability and Reactivity

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Thermally stable at typical use temperatures.

Possibility of hazardous reactions

Polymerization will not occur.

Conditions to Avoid: Some components of this product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers. Avoid contact with metals such as: Ferrous metals. Lead.

Hazardous decomposition products

Decomposition products depend upon temperature, air supply and the presence of other materials. Toxic gases are released during decomposition.

11. Toxicological Information

Acute Toxicity**Ingestion**

As product: Single dose oral LD50 has not been determined.

For similar material(s): LD50, rat, female 1,478 mg/kg

Dermal

As product: The dermal LD50 has not been determined.

For similar material(s): LD50, rabbit > 2,000 mg/kg

No deaths occurred at this concentration.

Inhalation

As product: The LC50 has not been determined.

For similar material(s): LC50, 4 h, Aerosol, rat > 1.3 mg/l

Maximum attainable concentration. No deaths occurred at this concentration.

Eye damage/eye irritation

May cause moderate eye irritation. May cause slight temporary corneal injury. In humans, eye irritation resulted from brief (minutes) exposure to cyclohexanone vapor concentration of 50 ppm and above.

Skin corrosion/irritation

Brief contact is essentially nonirritating to skin. Prolonged contact may cause skin irritation with local redness.

Sensitization**Skin**

For the active ingredient(s): Did not cause allergic skin reactions when tested in guinea pigs.

Respiratory

No relevant data found.

Repeated Dose Toxicity

For similar active ingredient(s): 2-methyl-4-chlorophenoxyacetic acid (MCPA). Blood. Kidney. Liver. Testes. Based on information for component(s): In animals, effects have been reported on the following organs: Blood. Central nervous system. Kidney. Liver. Respiratory tract.

Chronic Toxicity and Carcinogenicity

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

Carcinogenicity Classifications:

Component	List	Classification
Cyclohexanone	ACGIH	Confirmed animal carcinogen with unknown relevance to humans.; Group A3
Cumene	IARC	Possibly carcinogenic to humans.; 2B

Developmental Toxicity

Clopyralid caused birth defects in test animals, but only at greatly exaggerated doses that were severely toxic to the mothers. No birth defects were observed in animals given clopyralid at doses several times greater than those expected during normal exposure. For the active ingredient(s): MCPA-2-ethylhexyl. Has caused birth defects in laboratory animals only at doses toxic to the mother. Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Based on information for component(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Has caused birth defects in lab animals only at doses producing severe toxicity in the mother.

Reproductive Toxicity

Based on information for component(s): In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Cyclohexanone caused reduced growth and survival of offspring in an animal reproduction study. Dose levels producing this effect also caused central nervous system effects in parental animals. For the active ingredient(s): In animal studies, did not interfere with reproduction.

Genetic Toxicology

For the active ingredient(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative. Based on information for component(s): In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were inconclusive

12. Ecological Information

Toxicity

Data for Component: **3,6-Dichloropicolinic acid (Clopyralid)**

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). Material is slightly toxic to birds on an acute basis (LD50 between 501 and 2000 mg/kg). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm).

Fish Acute & Prolonged Toxicity

LC50, *Oncorhynchus mykiss* (rainbow trout), static test, 96 h: > 99.9 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, *Daphnia magna* (Water flea), static test, 48 h: > 99 mg/l

Aquatic Plant Toxicity

ErC50, *Pseudokirchneriella subcapitata* (green algae), Growth rate inhibition, 96 h: 33.1 mg/l

EC50, *Lemna gibba*, 14 d: 89 mg/l

Toxicity to Micro-organisms

EC50; Bacteria: > 100 mg/l

Fish Chronic Toxicity Value (ChV)

Pimephales promelas (fathead minnow), 34 d, NOEC: 10.8 mg/l

Aquatic Invertebrates Chronic Toxicity Value

Daphnia magna (Water flea), static test, 21 d, NOEC: 17 mg/l

Toxicity to Above Ground Organisms

oral LD50, *Anas platyrhynchos* (Mallard duck): 1465 mg/kg bodyweight.

dietary LC50, *Anas platyrhynchos* (Mallard duck): > 5000 mg/kg diet.

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

contact LD50, *Apis mellifera* (bees): > 98.1 micrograms/bee

Toxicity to Soil Dwelling Organisms

LC50, *Eisenia fetida* (earthworms), 14 d: > 1,000 mg/kg

Data for Component: **MCPA 2-EHE: 2-Methyl-4-Chlorophenoxyacetic Acid 2-Ethylhexyl Ester**

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm). Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg).

Fish Acute & Prolonged Toxicity

LC50, *Oncorhynchus mykiss* (rainbow trout), static test, 96 h: > 0.50 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, *Daphnia magna* (Water flea), 48 h: 0.29 mg/l

Aquatic Plant Toxicity

EyC50, *Skeletonema costatum*, Growth inhibition (cell density reduction), 96 h: 0.17 mg/l

EC50, *Lemna minor* (duckweed), 14 d: 0.13 mg/l

Toxicity to Above Ground Organisms

oral LD50, *Colinus virginianus* (Bobwhite quail): > 2250 mg/kg bodyweight.

dietary LC50, *Colinus virginianus* (Bobwhite quail): > 5620 mg/kg diet.

Data for Component: Cyclohexanone

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).

Fish Acute & Prolonged Toxicity

LC50, Leuciscus idus (Golden orfe), static test, 48 h: 630 mg/l

LC50, Pimephales promelas (fathead minnow), static test, 96 h: 527 - 732 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, Daphnia magna (Water flea), 24 h, immobilization: 820 mg/l

Toxicity to Micro-organisms

EC50, OECD 209 Test; activated sludge: > 1,000 mg/l

Data for Component: Solvent naphtha (petroleum), light aromatic consists of:

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). 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).

Fish Acute & Prolonged Toxicity

LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 h: 9.22 mg/l

Aquatic Invertebrate Acute Toxicity

For similar material(s): EC50, Daphnia magna (Water flea), 48 h: 3.2 mg/l

Aquatic Plant Toxicity

For similar material(s): ErC50, Pseudokirchneriella subcapitata (green algae), 72 h: 2.9 mg/l

Toxicity to Above Ground Organisms

dietary LC50, Colinus virginianus (Bobwhite quail): > 6500 mg/kg diet.

oral LD50, Colinus virginianus (Bobwhite quail): > 2150 mg/kg bodyweight.

Data for Component: 1,2,4-Trimethylbenzene

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).

Fish Acute & Prolonged Toxicity

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

Aquatic Invertebrate Acute Toxicity

EC50, Daphnia magna (Water flea), 48 h: 3.6 mg/l

Data for Component: 1,3,5-Trimethylbenzene

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).

Fish Acute & Prolonged Toxicity

LC50, Carassius auratus (goldfish), flow-through test, 96 h: 12.5 mg/l

Aquatic Invertebrate Acute Toxicity

LC50, Daphnia magna (Water flea), static test, 48 h, mortality: 6 mg/l

Aquatic Plant Toxicity

EbC50, alga Scenedesmus sp., biomass growth inhibition, 48 h: 25 mg/l

Aquatic Invertebrates Chronic Toxicity Value

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

Data for Component: Cumene

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).

Fish Acute & Prolonged Toxicity

LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 h: 2.7 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, Daphnia magna (Water flea), static test, 48 h, immobilization: 4.0 mg/l

Aquatic Plant Toxicity

EbC50, Pseudokirchneriella subcapitata (green algae), static test, biomass growth inhibition, 72 h: 2.6 mg/l

Aquatic Invertebrates Chronic Toxicity Value

Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, NOEC: 0.35 mg/l, LOEC: 0.66 mg/l

Toxicity to Above Ground Organismsoral LD50, redwing blackbird (*Agelaius phoeniceus*): > 98 mg/kg**Data for Component: Xylene**

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).

Fish Acute & Prolonged ToxicityLC50, *Oncorhynchus mykiss* (rainbow trout), 96 h: 9.2 mg/l**Aquatic Invertebrate Acute Toxicity**LC50, *Daphnia magna* (Water flea), 48 h, lethality: 14.3 mg/l**Aquatic Plant Toxicity**EbC50, *Pseudokirchneriella subcapitata* (green algae), biomass growth inhibition, 72 h: 3.2 - 4.9 mg/l**Persistence and Degradability****Data for Component: 3,6-Dichloropicolinic acid (Clopyralid)**

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

Stability in Water (1/2-life):

; pH 4 - 9; Stable

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
5 - 10 %	28 d	OECD 301B Test	fail

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
5.481E-13 cm ³ /s	19.5 d	Measured

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
		0 %	

Chemical Oxygen Demand: 0.73 mg/mg

Theoretical Oxygen Demand: 0.71 mg/mg

Data for Component: MCPA 2-EHE: 2-Methyl-4-Chlorophenoxyacetic Acid 2-Ethylhexyl Ester

No relevant information found.

Stability in Water (1/2-life):

76 d; 25 °C; pH 7; Measured

Data for Component: Cyclohexanone

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

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
87 %	14 d	OECD 301C Test	Not applicable

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
1.21E-11 cm ³ /s	10.6 h	Estimated.

Theoretical Oxygen Demand: 2.61 mg/g

Data for Component: Solvent naphtha (petroleum), light aromatic consists of:

For the major component(s): Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%). For some component(s): Biodegradation under aerobic static laboratory conditions is low (BOD20 or BOD28/ThOD between 2.5 and 10%).

Data for Component: 1,2,4-Trimethylbenzene

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

OECD Biodegradation Tests:

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

Indirect Photodegradation with OH Radicals

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

Theoretical Oxygen Demand: 3.19 mg/mg

Data for Component: 1,3,5-Trimethylbenzene

Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

OECD Biodegradation Tests:

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

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
3.51E-11 cm ³ /s	3.7 h	Estimated.

Theoretical Oxygen Demand: 3.19 mg/mg

Data for Component: Cumene

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

OECD Biodegradation Tests:

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

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
6.90E-12 cm ³ /s	1.55 d	Estimated.

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
40.000 %	62.000 %	70.000 %	

Theoretical Oxygen Demand: 3.20 mg/mg

Data for Component: Xylene

Material is expected to be readily biodegradable.

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
6.5E-12 cm ³ /s	19.7 h	Estimated.

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
37.000 %	58.000 %	72.000 %	

Theoretical Oxygen Demand: 3.17 mg/mg

Bioaccumulative potential**Data for Component: 3,6-Dichloropicolinic acid (Clopyralid)**

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

Partition coefficient, n-octanol/water (log Pow): -2.63

Bioconcentration Factor (BCF): < 1; Fish; Measured

Data for Component: MCPA 2-EHE: 2-Methyl-4-Chlorophenoxyacetic Acid 2-Ethylhexyl Ester

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

Partition coefficient, n-octanol/water (log Pow): 6.17 Estimated.

Bioconcentration Factor (BCF): 11,250

Data for Component: Cyclohexanone

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

Partition coefficient, n-octanol/water (log Pow): 0.81 Measured

Data for Component: Solvent naphtha (petroleum), light aromatic consists of:

Bioaccumulation: For the major component(s): Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5). For the minor component(s): Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Data for Component: 1,2,4-Trimethylbenzene

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

Partition coefficient, n-octanol/water (log Pow): 3.63 Measured

Bioconcentration Factor (BCF): 33 - 275; Cyprinus carpio (Carp); Measured

Data for Component: 1,3,5-Trimethylbenzene

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

Partition coefficient, n-octanol/water (log Pow): 3.42 Measured

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

Data for Component: Cumene

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

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

Bioconcentration Factor (BCF): 35.5; Fish; Measured

Data for Component: Xylene

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

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

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

Mobility in soilData for Component: 3,6-Dichloropicolinic acid (Clopyralid)

Mobility in soil: Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient, soil organic carbon/water (Koc): 4.9Henry's Law Constant (H): 4.92E-09 atm*m3/mole; 25 °C Estimated.

Data for Component: MCPA 2-EHE: 2-Methyl-4-Chlorophenoxyacetic Acid 2-Ethylhexyl Ester

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

Partition coefficient, soil organic carbon/water (Koc): 10,500 Estimated.

Henry's Law Constant (H): 6.253E-05 atm*m3/mole; 25 °C Estimated.

Data for Component: Cyclohexanone

Mobility in soil: Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient, soil organic carbon/water (Koc): 15 Estimated.

Henry's Law Constant (H): 1.04E-05 atm*m3/mole Measured

Data for Component: Solvent naphtha (petroleum), light aromatic consists of:

Mobility in soil: For the major component(s); Potential for mobility in soil is low (Koc between 500 and 2000).

Data for Component: 1,2,4-Trimethylbenzene

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

Partition coefficient, soil organic carbon/water (Koc): 720 Estimated.

Henry's Law Constant (H): 6.16E-03 atm*m3/mole; 25 °C Measured

Data for Component: 1,3,5-Trimethylbenzene

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

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

Henry's Law Constant (H): 1.97E-02 atm*m3/mole; 25 °C Estimated.

Distribution in Environment: Mackay Level 1 Fugacity Model:

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

Data for Component: Cumene

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

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

Henry's Law Constant (H): 1.15E-02 atm*m3/mole; 25 °C Measured

Distribution in Environment: Mackay Level 1 Fugacity Model:

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

Data for Component: Xylene

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

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

Henry's Law Constant (H): 7.45E-03 atm*m3/mole; 25 °C Estimated.

13. Disposal Considerations

If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

14. Transport Information

TDG Small container

TDG not required for road or rail per Sec. 1.33

TDG Large container

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

Technical Name: Solvent naphtha (petroleum), light aromatic, CYCLOHEXANONE

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

IMDG

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

Technical Name: Solvent naphtha (petroleum), light aromatic, CYCLOHEXANONE

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

EMS Number: F-E,S-E

Marine pollutant: Yes

ICAO/IATA

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

Technical Name: Solvent naphtha (petroleum), light aromatic, CYCLOHEXANONE

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

Cargo Packing Instruction: 366

Passenger Packing Instruction: 355

15. Regulatory Information

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

Hazardous Products Act Information: CPR Compliance

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Hazardous Products Act Information: WHMIS Classification

This product is exempt under WHMIS.

Pest Control Products Act Registration number: 30914

National Fire Code of Canada

Class II

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	1	2	0

Recommended Uses and Restrictions

Identified uses

Product use: End use herbicide product

Revision

Identification Number: 50405 / 1023 / Issue Date 2014.01.13 / Version: 8.4

DAS Code: XRM-5171

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

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
VOL/VOL	Volume/Volume

Dow AgroSciences Canada Inc. 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.