

Material Safety Data Sheet

DOW AGROSCIENCES CANADA INC.

Product name: PARADIGM™ Herbicide

Issue Date: 02/02/2015

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: PARADIGM™ Herbicide

Recommended use of the chemical and restrictions on use

Identified uses: End use herbicide product

COMPANY IDENTIFICATION

DOW AGROSCIENCES CANADA INC.
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 Date: 02/02/2015

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

Appearance

Physical state Granules

Color Tan

Odor Mild

Hazard Summary

WARNING!!

May cause allergic skin reaction.

May cause eye irritation.

Isolate area.

Slipping hazard.

Toxic fumes may be released in fire situations.

Highly toxic to fish and/or other aquatic organisms.

Cancer hazard.

Can cause cancer.

Potential Health Effects

Eyes: May cause slight eye irritation.
Corneal injury is unlikely.

Skin: Prolonged skin contact is unlikely to result in absorption of harmful amounts.
Has demonstrated the potential for contact allergy in mice.
Essentially nonirritating to skin.

Inhalation: No adverse effects are anticipated from single exposure to dust.
Based on the available data, respiratory irritation was not observed.

Ingestion: Very low toxicity if swallowed.
Harmful effects not anticipated from swallowing small amounts.

Chronic Exposure: For the active ingredient(s):
In animals, effects have been reported on the following organs:
Kidney.
Liver.
Has been toxic to the fetus in laboratory animals at doses toxic to the mother.
For the minor component(s):
Has caused cancer in humans.
Has caused cancer in laboratory animals.
Lung fibrosis and tumors have been observed in rats exposed to titanium dioxide in two lifetime inhalation studies. Effects are believed to be due to overloading of the normal respiratory clearance mechanisms caused by the extreme study conditions. Workers exposed to titanium dioxide in the workplace have not shown an unusual incidence of chronic respiratory disease or lung cancer.
Titanium dioxide was not carcinogenic in laboratory animals in lifetime feeding studies.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature: Mixture
This product is a mixture.

Component	CASRN	Weight percent
Halauxifen-methyl	943831-98-9	20.85%
Florasulam	145701-23-1	20.0%
Kaolin	1332-58-7	>= 0.4 - <= 12.6 %
Titanium dioxide	13463-67-7	0.3%
Silica, crystalline (quartz)	14808-60-7	0.1%
Balance	Not available	>= 46.15 - <= 58.35 %

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.

Skin contact: Take off contaminated clothing. Wash skin with soap and plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Wash clothing before reuse. Shoes and other leather items which cannot be decontaminated should be disposed of properly.

Eye contact: Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. Call a poison control center or doctor for treatment advice.

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 center or doctor, or going for treatment.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Water. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers.

Unsuitable extinguishing media: no data available

Special hazards arising from the substance or mixture

Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Hydrogen fluoride. Hydrogen cyanide. Hydrogen chloride. Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Pneumatic conveying and other mechanical handling operations can generate combustible dust. To reduce the potential for dust explosions, do not permit dust to accumulate.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Consider feasibility of a controlled burn to minimize environment damage. Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Soak thoroughly with water to cool and prevent re-ignition. Hand held dry chemical or carbon dioxide extinguishers may be used for small fires. Processing this product may generate dusts. Dust explosion hazard may result from forceful application of fire extinguishing agents. 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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Spilled material may cause a slipping hazard. 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. Small spills: Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing dust or mist. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling. Use with adequate ventilation. Good housekeeping and controlling of dusts are necessary for safe handling of product. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage: Store in a dry place. Store in original container. Do not store near food, foodstuffs, drugs or potable water supplies.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Kaolin	ACGIH	TWA Respirable fraction	2 mg/m ³
	CA AB OEL	TWA Respirable	2 mg/m ³
	CA BC OEL	TWA Respirable	2 mg/m ³
	CA QC OEL	TWAEV respirable dust	5 mg/m ³
Titanium dioxide	ACGIH	TWA	10 mg/m ³ , Titanium dioxide
	CA AB OEL	TWA	10 mg/m ³
	CA BC OEL	TWA	10 mg/m ³
	CA QC OEL	TWAEV total dust	10 mg/m ³

Silica, crystalline (quartz)	ACGIH	TWA Respirable fraction	0.025 mg/m ³ , Silica
	CA AB OEL	TWA Respirable particulates	0.025 mg/m ³
	CA ON OEL	TWA Respirable fraction	0.1 mg/m ³
	CA QC OEL	TWAEV respirable dust	0.1 mg/m ³
	CA BC OEL	TWA Respirable	0.025 mg/m ³ , Silica

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.

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: Polyvinyl chloride ("PVC" or "vinyl"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). 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, in dusty atmospheres, use an approved particulate 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	Granules
Color	Tan
Odor	Mild
Odor Threshold	No test data available
pH	5.62 <i>pH Electrode</i> (1% aqueous suspension)
Melting point/range	Not determined

Freezing point	Not applicable
Boiling point (760 mmHg)	Not applicable
Flash point	closed cup Not applicable
Evaporation Rate (Butyl Acetate = 1)	Not applicable
Flammability (solid, gas)	no data available
Lower explosion limit	Not applicable
Upper explosion limit	Not applicable
Vapor Pressure	Not applicable
Relative Vapor Density (air = 1)	Not applicable
Relative Density (water = 1)	no data available
Water solubility	Not determined
Partition coefficient: n-octanol/water	no data available
Auto-ignition temperature	Not applicable
Decomposition temperature	No test data available
Kinematic Viscosity	Not applicable
Explosive properties	No
Oxidizing properties	No significant increase (>5C) in temperature.
Bulk density	0.59 g/m3 <i>Loose Volumetric</i>
Molecular weight	no data available

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

10. STABILITY AND REACTIVITY

Reactivity: no data available

Chemical stability: Stable under recommended storage conditions. See Storage, Section 7.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose.

Incompatible materials: Avoid contact with: Strong oxidizers.

Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials.

11. TOXICOLOGICAL INFORMATION

Toxicological information on this product or its components appear 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.

LD50, Rat, female, > 5,000 mg/kg No deaths occurred at this concentration.

Acute dermal toxicity

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

LD50, Rat, male and female, > 5,000 mg/kg No deaths occurred at this concentration.

Acute inhalation toxicity

No adverse effects are anticipated from single exposure to dust. Based on the available data, respiratory irritation was not observed.

Maximum attainable concentration.

LC50, Rat, male and female, 4 Hour, dust/mist, > 2.27 mg/l No deaths occurred at this concentration.

Skin corrosion/irritation

Essentially nonirritating to skin.

Serious eye damage/eye irritation

May cause slight eye irritation.

Corneal injury is unlikely.

Sensitization

Has demonstrated the potential for contact allergy in mice.

For respiratory sensitization:

No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

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

Specific Target Organ Systemic Toxicity (Repeated Exposure)

For the active ingredient(s):

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

Kidney.

Liver.

Carcinogenicity

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

For the minor component(s): Has caused cancer in humans. Has caused cancer in laboratory animals.

Lung fibrosis and tumors have been observed in rats exposed to titanium dioxide in two lifetime inhalation studies. Effects are believed to be due to overloading of the normal respiratory clearance mechanisms caused by the extreme study conditions. Workers exposed to titanium dioxide in the workplace have not shown an unusual incidence of chronic respiratory disease or lung cancer. Titanium dioxide was not carcinogenic in laboratory animals in lifetime feeding studies.

Teratogenicity

For the active ingredient(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

For the active ingredient(s): Florasulam. Did not cause birth defects or other effects in the fetus even at doses which caused toxic effects in the mother.

Reproductive toxicity

For the active ingredient(s): Florasulam. For similar active ingredient(s). Halauxifen. In animal studies, did not interfere with reproduction.

Mutagenicity

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

Aspiration Hazard

Based on physical properties, not likely to be an aspiration hazard.

Carcinogenicity**Component****List****Classification**

Kaolin

IARC

Group 1: Carcinogenic to humans

Titanium dioxide

IARC

Group 2B: Possibly carcinogenic to humans

Silica, crystalline (quartz)

IARC

Group 1: Carcinogenic to humans

ACGIH

A2: Suspected human carcinogen

12. ECOLOGICAL INFORMATION

Ecotoxicological information on this product or its components appear in this section when such data is available.

Toxicity**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).

Acute toxicity to algae/aquatic plants

ErC50, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, 0.0478 mg/l

Estimated.

ErC50, Lemna gibba, static test, 7 d, > 0.0050 mg/l

ErC50, Other, static test, 14 d, > 0.00387 mg/l

Persistence and degradability**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

Florasulam

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

10-day Window: Fail

Biodegradation: 2 %

Exposure time: 28 d

Method: OECD Test Guideline 301B or Equivalent

Theoretical Oxygen Demand: 0.85 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
	0.012 mg/mg

Stability in Water (1/2-life)

, > 30 d

Photodegradation

Atmospheric half-life: 1.82 Hour

Method: Estimated.

Kaolin

Biodegradability: Biodegradation is not applicable.

Titanium dioxide

Biodegradability: Biodegradation is not applicable.

Silica, crystalline (quartz)

Biodegradability: Biodegradation is not applicable.

Balance

Biodegradability: No relevant data found.

Bioaccumulative potential**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

Florasulam

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

Partition coefficient: n-octanol/water(log Pow): -1.22

Bioconcentration factor (BCF): 0.8 Fish. 28 d Measured

Titanium dioxide

Bioaccumulation: Partitioning from water to n-octanol is not applicable.

Silica, crystalline (quartz)

Bioaccumulation: Partitioning from water to n-octanol is not applicable.

Balance

Bioaccumulation: No relevant data found.

Mobility in soil**Halauxifen-methyl**

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

Partition coefficient(Koc): 5684

Florasulam

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

Partition coefficient(Koc): 4 - 54

Silica, crystalline (quartz)

No relevant data found.

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, SOLID, N.O.S.(Florasulam)
UN number	UN 3077
Class	9
Packing group	III
Marine pollutant	Florasulam

Classification for SEA transport (IMO-IMDG):

Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(Florasulam)
UN number	UN 3077
Class	9
Packing group	III
Marine pollutant	Florasulam
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, solid, n.o.s.(Florasulam)
UN number	UN 3077
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

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.

National Fire Code of Canada

Not applicable

Canadian Domestic Substances List (DSL) (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 Registration Number: 31304

16. OTHER INFORMATION

Hazard Rating System**NFPA**

Health	Fire	Reactivity
1	1	0

Revision

Identification Number: 101205083 / A215 / Issue Date: 02/02/2015 / Version: 1.2

DAS Code: GF-2687

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

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
CA AB OEL	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
CA BC OEL	Canada. British Columbia OEL
CA ON OEL	Ontario Table of Occupational Exposure Limits made under the Occupational Health and Safety Act.
CA QC OEL	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
TWA	8-hour time weighted average
TWAEV	Time-weighted average exposure value

Information Source and References

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

DOW AGROSCIENCES 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.