MATERIAL SAFETY DATA SHEET

Syngenta Crop Protection Canada, Inc.
140 Research Lane, Research Park
Guelph, ON N1G 4Z3

In Case of Emergency, Call
1-800-327-8633 (FAST MED)

Date of MSDS Preparation (Y/M/D): 2005-09-01

Supersedes date (Y/M/D): 03-09-18

MSDS prepared by:
Department of Regulatory & Biology Development
Syngenta Crop Protection Canada, Inc.

For further information contact:
1-87-SYNGENTA (1-877-964-3682)

SECTION – 1: PRODUCT IDENTIFICATION

Product Identifier: **HORIZON® 240EC Herbicide** Formulation No.: A8588C
Registration Number: 24076 (Pest Control Products Act)
Chemical Class: Carboxylic acid derivative herbicide.
Synonym: None.

Active Ingredient (%): Clodinafop-Propargyl (22.3%) CAS NO.: 105512-06-9
Chemical Name : Propanoic acid, 2-[4-[(5-chloro-3-fluoro-2-pyridinyl)oxy]-phenoxy]-2-propynyl ester.
Product Use: Post-emergence herbicide for use in wheat. Please refer to product label for further details.

SECTION – 2 : COMPOSITION/INFORMATION ON INGREDIENTS

Material	OSHA PEL	ACGIH TLV	Other	NTP/IARC/OSHA Carcinogen	WHMIS†
Naphthalene (≤ 6%) (CAS No. 91-20-3)	10 ppm TWA	10 ppm TWA (skin)	10 ppm TWA**	Possible Human Carcinogen – See Section 11	Yes
n-Methylpyrrolidone (≤ 9%)	Not Established	Not Established	10 ppm TWA****	No	Not Established
Petroleum Solvent	Not Established	Not Established	100 mg/m^3 (15 ppm) TWA*	No	Not Established
Cloquintocet-Mexyl	Not Established	Not Established	10 ppm TWA***	No	Not Established
Clodinafop-Propargyl (22.3%)	Not Established	Not Established	Not Established	No	Not Established

* Recommended by manufacturer
** Recommended by NIOSH
*** Syngenta Occupational Exposure Limit (OEL)
**** Recommended by AIHA (American Industrial Hygiene Association)
† Material listed in Ingredient Disclosure List under Hazardous Products Act.

Ingredients not precisely identified are proprietary or non-hazardous. Values are not product specifications.
Syngenta Hazard Category: C, S

SECTION – 3: HAZARDS IDENTIFICATION

Symptoms of Acute Exposure

Causes eye, skin and respiratory passage irritation. Allergic skin reactions are possible.
Exposure to high vapor levels may cause headache, dizziness, numbness, nausea, incoordination, or other central nervous system effects.

Hazardous Decomposition Products

Can decompose at high temperatures forming toxic gases.

Physical Properties

Appearance: Light to dark brown liquid.
Odour: Aromatic solvent.

Unusual Fire, Explosion and Reactivity Hazards

Combustible liquid. Can release vapours that form explosive mixtures at temperatures at or above the flash point. Heavy vapours can flow along surfaces to distant ignition sources and flash back. During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

Potential Health Effects

Relevant routes of exposure: Skin, eyes, mouth, lungs.

SECTION – 4: FIRST AID MEASURES

IF POISONING IS SUSPECTED, immediately contact the poison information centre, doctor or nearest hospital. Have the product container, label or Material Safety Data Sheet with you when calling Syngenta, a poison control center or doctor, or going for treatment. Tell the person contacted the complete product name, and the type and amount of exposure. Describe any symptoms and follow the advice given. Call the Syngenta Emergency Line [**1-800-327-8633** (**1-800-FASTMED**)], for further information.

EYE CONTACT:	Immediately flush eyes with clean water, holding eyelids apart for a minimum of 20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call Syngenta, a poison control center or doctor for treatment advice. Obtain medical attention immediately if irritation persists.
SKIN CONTACT:	Immediately remove contaminated clothing and wash skin, hair and fingernails thoroughly with soap and water. Flush skin with running water for a minimum of 20 minutes. Obtain medical attention if irritation occurs.
INHALATION:	Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is laboured, give oxygen. Obtain immediate medical attention.
INGESTION:	If swallowed, immediately contact Syngenta, a poison control centre, doctor or nearest hospital for treatment advice. Provided the patient is conscious, wash out mouth with water. Do not give anything by mouth to an unconscious person. Do not induce vomiting unless directed by a physician or a poison control center. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer water.

NOTES TO PHYSICIAN:

There is no specific antidote if this product is ingested. Treat symptomatically.
Contains petroleum distillate - vomiting may cause aspiration pneumonia.

MEDICAL CONDITIONS KNOWN TO BE AGGRAVATED: Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product.

SECTION – 5: FIRE FIGHTING MEASURES

Flash point and method: 62 ºC (PM CC).
Upper and lower flammable (explosive) limits in air: Lower: 1.0% Upper: 7.0%
Auto-ignition temperature: 510 ºC.
Flammability: Flammable liquid.
Hazardous combustion products: Oxides or carbon and smoke are likely. Also toxic fumes of Cl^- and NO_x from decomposition of active ingredients.
Unusual Fire, Explosion and Reactivity Hazards: Combustible liquid. Can release vapours that form explosive mixtures at temperatures at or above the flash point. Heavy vapours can flow along surfaces to distant ignition sources and flash back. During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

Conditions under which flammability could occur: This product contains aromatic hydrocarbon. Temperatures above the flash point. Keep fire exposed containers cool by spraying with water.
Extinguishing media: Use water fog or mist, (avoid excess water), foam, carbon dioxide, dry powder or halon extinguishant. Wear full protective clothing and self-contained breathing apparatus. Evacuate nonessential personnel from the area to prevent human exposure to fire, smoke, fumes or products of combustion. Prevent use of contaminated buildings, area, and equipment until decontaminated. Water runoff can cause environmental damage. Contain run-off water with, for example, temporary earth barriers.
Sensitivity to explosion by mechanical impact: Not sensitive.
Sensitivity to explosion by static discharge: Low.

SECTION – 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Make sure all personnel involved in the spill cleanup follow good industrial hygiene practices. A small spill can be handled routinely. Wear suitable protective clothing and eye protection to prevent skin and eye contact. Use adequate ventilation and wear an air-supplied respirator to prevent inhalation.
Procedures for dealing with release or spill: Control the spill at its source. Contain the spill to prevent from spreading or contaminating soil or from entering sewage and drainage systems or any body of water. Clean up spills immediately, observing precautions outlined in Sections 7 and 8. Pump or scoop large amounts of liquid into a disposable container. Absorb remaining liquid or smaller spills with clay, sand or vermiculite. Scoop or sweep up material and place into a disposal container. Wash area with detergent and water. Pick up wash liquid with additional absorbent and place into compatible disposal container. On soils, skim off the upper contaminated layer and collect for disposal. Once all material is cleaned up and placed in a disposal container, seal container and arrange for disposition. Spillages or uncontrolled discharges into watercourses must be alerted to the appropriate regulatory body.

SECTION – 7: HANDLING AND STORAGE

Handling practices: KEEP OUT OF REACH OF CHILDREN and animals. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. After work, rinse gloves and remove protective equipment. Wash hands thoroughly with soap and water after handling, and before eating, tobacco use, drinking, or using the toilet. Wash contaminated clothing before re-use and separate from household laundry. Keep containers closed when not in use. Keep product, wash or rinse water, and contaminated materials out of water, away from crops, and away from access by people, animals and birds.
Appropriate storage practices/requirements: Store in original container only in a well-ventilated, cool, dry, secure area. Protect from heat, sparks and flame. Do not expose sealed containers to temperatures above 40 °C. Keep separate from other products to prevent cross contamination. Rotate stock. Clean up spilled material immediately.

National Fire Code classification: IIIA (Min. 70 ºC) Comb.Liq.

SECTION – 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Applicable control measures, including engineering controls: Ensure work areas have ventilation, containment, and procedures sufficient to maintain airborne levels below the TLV. Warehouses, production area, parking lots and waste holding facilities must have adequate containment to prevent environmental contamination. Provide separate shower and eating facilities.

THE FOLLOWING RECOMMENDATIONS FOR EXPOSURE CONTROLS/PERSONAL PROTECTION ARE INTENDED FOR THE MANUFACTURE, FORMULATION, PACKAGING AND USE OF THIS PRODUCT.

FOR COMMERCIAL APPLICATIONS AND/OR ON-FARM APPLICATIONS CONSULT THE PRODUCT LABEL.

Personal protective equipment for each exposure route:
General: Avoid breathing vapours or aerosols. Avoid contact with eye, skin and clothing. Wash thoroughly after handling and before eating, drinking, or using tobacco.

INGESTION: Do not eat, drink, handle tobacco, or apply cosmetics in areas where there is a potential for exposure to this material. Always wash thoroughly after handling.

EYES: Where eye contact is likely, use chemical splash goggles. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

SKIN: Where contact is likely, wear chemical-resistant (such as nitrile or butyl) gloves, coveralls, socks and chemical-resistant footwear. For overhead exposure, wear chemical-resistant headgear.

INHALATION: A respirator is not normally required when handling this substance. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below exposure limits. A NIOSH-certified combination air-purifying respirator with an N, P or R 95 or HE class filter and an organic vapor cartridge may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a pressure demand atmosphere-supplying respirator if there is any potential for uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.

SECTION – 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Light to dark brown liquid.
Formulation Type: Emulsifiable concentrate.
Odour: Aromatic solvent.
pH: 4 – 7 (1% aqueous solution).
Vapour pressure and reference temperature: 4.0×10^{-8} mmHg @ 20 ^{o}C (Clodinafop-Propargyl Technical).
Vapour density: Not available.
Boiling point: 177 – 210 ^{o}C.
Melting point: Not applicable.
Freezing point: -31 ^{o}C.
Specific gravity or density: 1.06 – 1.10 g/cm^{3}.
Evaporation Rate: Aromatic hydrocarbon 0.03 (BuAc = 1).
Water/oil partition coefficient: Not available.
Odour threshold: Not available.
Viscosity: 26.3 cps @ 21 ^{o}C.
Solubility in Water: 4 mg/L @ 25 ^{o}C (Clodinafop-Propargyl technical).

SECTION – 10: STABILITY AND REACTIVITY

Chemical stability:	Stable at room temperature.
Conditions to avoid:	Ignition sources. Temperatures below -17 °C (2 °F) or above 62 °C (144 °F).
Incompatibility with other materials:	Strong oxidizers, strong acids, alkalies.
Hazardous decomposition products:	Can decompose at high temperatures forming toxic gases.
Hazardous polymerization:	Will not occur.

SECTION – 11: TOXICOLOGICAL INFORMATION

Acute toxicity/Irritation Studies (Finished Product):

Ingestion:	Slightly Toxic Oral (LD50 Rat):	> 2,276 mg/kg body weight
Dermal:	Slightly Toxic Dermal (LD50 Rat):	> 4,000 mg/kg body weight
Inhalation:	Slightly Toxic Inhalation (LC50 Rat):	> 3.5 mg/L air - 4 hours
Eye Contact:	Moderately Irritating (Rabbit)	
Skin Contact:	Moderately Irritating (Rabbit)	
Skin Sensitization:	Sensitizer (Guinea Pig)	

Reproductive/Developmental Effects

Clodinafop-Propargyl: None Observed.

Chronic/Subchronic Toxicity Studies

Clodinafop-Propargyl: Liver changes, anemia and skin reactions.

Carcinogenicity

Clodinafop-Propargyl: Increased incidences of benign tumors in mice (liver) and rats (ovary, prostate).

Other Toxicity Information:

None.

Toxicity of Other Components

The acute toxicity test results reported in Section 11, above, for the finished product take into account any acute hazards related to the "other components" in the formulation.

Cloquintocet-Mexyl

Causes mild eye and skin irritation. Toxic if inhaled or swallowed. Allergic skin reactions are possible.

Naphthalene (≤ 6%)

Exposure to naphthalene can cause cataracts, liver damage, kidney failure, respiratory failure, hematuria, anemia, damage to red blood cells, leukocytosis, or coma.

Carcinogen Status:

NTP: Anticipated Carcinogen

IARC: Group 2B Possible Human Carcinogen

Petroleum Solvent

Inhalation of vapors at high concentrations can cause central nervous system (CNS) effects (e.g. dizziness, headache, etc.), irritation to eyes or respiratory tract.

n-Methylpyrrolidone (≤ 9%)

May cause respiratory tract irritation. Repeated or prolonged exposure may cause drying and cracking of the skin.

Other materials that show synergistic toxic effects together with the product: None known.

Target Organs

Active Ingredient

Clodinafop-Propargyl:	Liver, skin, bone marrow.

Inert Ingredients

Cloquintocet-Mexyl:	Eye, skin, lung, digestive tract.
Naphthalene:	Eye, liver, kidney, respiratory tract, blood, CNS.
Petroleum Solvent:	Respiratory tract, stomach, liver, thyroid, urinary bladder, CNS, skin.
n-Methylpyrrolidone:	Eye, skin.

SECTION – 12: ECOLOGICAL INFORMATION

Summary of Effects

Horizon 240EC kills certain grass weeds selectively in cereal crops. If sufficient exposure occurs, it may be harmful to grass species. The active ingredient clodinafop propargyl is also highly toxic to fish, but has low toxicity to birds and mammals and practically no toxicity to insects (bees).

Eco-Acute Toxicity

Clodinafop-Propargyl:

Bees LC_{50}/EC_{50}	> 100 µg/bee
Invertebrates (Water Flea) LC_{50}/EC_{50}	> 2 ppm
Fish (Trout) LC_{50}/EC_{50}	0.39 ppm
Fish (Bluegill) LC_{50}/EC_{50}	0.21 ppm
Birds (8-day dietary - Bobwhite Quail) LC_{50}/EC_{50}	> 5,200 ppm
Birds (8-day dietary - Mallard Duck) LC_{50}/EC_{50}	> 5,200 ppm

Eco-Chronic Toxicity

Clodinafop-Propargyl:

Invertebrate (*Daphnia magna*) 21-Day Reproduction EC50	0.14 mg./L
Fish (Rainbow Trout): 21 Day NOEC	0.15 mg./L

Environmental Fate

The active ingredient Clodinafop propargyl is biologically degraded by microorganisms in soil or water, and is also degraded by soil hydrolysis and photolysis. It has a low bioaccumulation potential. It is not persistent in the environment, with DT50 values of less than one day in soil or natural water. The mobility in soil is low to moderate. Horizon as a bulk liquid sinks in water (24 hr observation) and gradually disperses as an emulsion.

SECTION – 13: DISPOSAL CONSIDERATIONS

Waste disposal information: Do not reuse empty containers. Empty container retains product residue. Triple rinse, or equivalent, empty container, return rinse water to dilution mixture, and dispose of dilution mixture as a hazardous waste if it cannot be disposed of by use according to label instructions. Dispose of empty containers in accordance with local regulations. Consult provincial environment ministry for advice on waste disposal. Industrial/commercial waste may be handled at licensed facilities only. Waste shipments must be securely packaged and properly labelled. Only licensed carriers may be used, and proper documents must accompany the shipment.

SECTION – 14 : TRANSPORT INFORMATION

Shipping information such as shipping classification:

TRANSPORTATION OF DANGEROUS GOODS CLASSIFICATION - ROAD/RAIL
Not Regulated.

IATA CLASSIFICATION - AIR
Not regulated.

SECTION – 15: REGULATORY INFORMATION

WHMIS classification for product: Exempt

A statement that the MSDS has been prepared to meet WHMIS requirements, except for use of the 16 headings.
This MSDS has been prepared in accordance with WHMIS requirements, but the data are presented under 16 headings.

Other regulations; restrictions and prohibitions

Pest Control Products (PCP) Act Registration No.: 24076

SECTION – 16: OTHER INFORMATION

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Syngenta will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years. This product is under the jurisdiction of the Pest Control Products Act and is exempt from the requirements for a WHMIS compliant MSDS. Hazardous properties of all ingredients have been considered in the preparation of this MSDS. Read the entire MSDS for the complete hazard evaluation of this product.

Prepared by: Syngenta Crop Protection Canada, Inc.
1-87-SYNGENTA (1-877-964-3682)

Syngenta Crop Protection Canada, Inc. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date thereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR

PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates to the specific product designated and may no be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use of the product and of the information referred to herein are beyond the control of Syngenta Crop Protection Canada, Inc., Syngenta Crop Protection Canada, Inc. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

® Registered trademark of a Syngenta group company