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

**Date of MSDS Preparation (Y/M/D): 2007-12-31**

**Supersedes date (Y/M/D): 2005-12-31**

**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:** DUAL® II MAGNUM®

Formulation No.: A9558C

**Registration Number:** 25729 (Pest Control Products Act)

**Chemical Class:** Chloroacetanilide herbicide with substituted benzoxazine safener.

**Synonym:** None

**Active Ingredient (%):** s-Metolachlor (82.4%)

CAS No.: 87392-12-9

**Chemical Name :** (1S)-2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide

**Product Use:**

Liquid herbicide emulsifiable concentrate to be mixed with water for weed control on corn, soybeans, certain fruits, vegetables and trees. DUAL II MAGNUM may be mixed with fertilizer or other products prior to use. The safener, benoxacor, increases the tolerance of corn to the herbicide. For further details please refer to product label.

## SECTION – 2 : COMPOSITION/INFORMATION ON INGREDIENTS

Material	OSHA PEL	ACGIH TLV	Other	NTP/IARC/OSHA Carcinogen	WHMIS†
Benoxacor (≤ 4%) CAS No. 98730-04-2	Not Established	Not Established	1 mg/m <sup>3</sup> TWA***	No	Not Established
Naphthalene (≤ 1%) CAS No. 91-20-3	10 ppm TWA	10 ppm TWA (skin)	10 ppm TWA**	NTP: “Anticipated Carcinogen” IARC: Group 2B Possible Human Carcinogen	Yes
s-Metolachlor (82.4%)	Not Established	Not Established	10 mg/m <sup>3</sup> TWA***	No	Not Established

\*\* Recommended by NIOSH

\*\*\* Syngenta Occupational Exposure Limit (OEL)

† Material listed in Ingredient Disclosure List under Hazardous Products Act.

Ingredients not precisely identified are proprietary or non-hazardous. Values are not product specifications.

## SECTION – 3: HAZARDS IDENTIFICATION

**Symptoms of Acute Exposure**

Causes eye, skin and respiratory passage irritation. Allergic skin reactions are possible.

Exposure to high vapour 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: Dark brown Liquid.  
Odour: Petroleum-like odour.

### **Unusual Fire, Explosion and Reactivity Hazards**

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:** 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:**

DUAL II MAGNUM is emulsifiable in water and contains the chloroacetanilide herbicide, S-metolachlor. It also contains a small amount of a petroleum solvent, so small amounts aspirated into the respiratory system during ingestion or vomiting may cause pulmonary injury. There is no specific antidote. Treat symptoms. If a large amount has been ingested and emesis has been inadequate, lavage stomach. The active ingredient in this product has a high affinity for activated charcoal. A suspension of activated charcoal in water can be given to absorb the remaining toxicant. Skin reactions have been treated with antihistamines and ointments containing an anti-inflammatory agent.

### **MEDICAL CONDITIONS KNOWN TO BE AGGRAVATED:**

Individuals with known sensitivity to metolachlor should not be exposed to this product. Individuals with allergic history or pre-existing dermatitis should use extra care in handling this product.

## **SECTION – 5: FIRE FIGHTING MEASURES**

**Flash point and method:** 93.3 °C (Setaflash).

**Upper and lower flammable (explosive) limits in air:** Not available.

**Auto-ignition temperature:** Not available.

**Flammability:** Not applicable.

**Hazardous combustion products:** Thermal decomposition products may include carbon monoxide, carbon dioxide, hydrogen cyanide, acetonitrile, oxides of sulfur, hydrogen sulphide, oxides of nitrogen and phosphorous.

**Conditions under which flammability could occur:** High temperatures, open flames. Product is not flammable. Keep fire exposed containers cool by spraying with water.

**Extinguishing media:** Use 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:** No.

**Sensitivity to explosion by static discharge:** No.

## 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 and prevent product from freezing. Keep separate from other products to prevent cross contamination. Rotate stock. Clean up spilled material immediately.

**National Fire Code classification:** Not applicable.

## SECTION – 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**Applicable control measures, including engineering controls:** This product is intended for use outdoors where engineering controls are not necessary. If necessary, 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.**

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

**Personal protective equipment for each exposure route:**

General: Avoid breathing dust, vapours or aerosols. Avoid contact with eye, skin and clothing. Wash thoroughly after handling and before eating, drinking, or handling 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:** Dark brown Liquid.

**Formulation Type:** Emulsifiable concentrate.

**Odour:** Petroleum-like odour.

**pH:** 7.2 (1% aqueous solution @ 25 °C).

**Vapour pressure and reference temperature:**  $2.8 \times 10^{-5}$  mmHg @ 25 °C (s-Metolachlor Technical).

**Vapour density:** Not available.

**Boiling point:** Not available.

**Melting point:** Not available.

**Freezing point:** - 20 °C

**Specific gravity or density:** 1.11 g/cm<sup>3</sup> @ 20 °C.

**Evaporation Rate:** Not available.

**Water/oil partition coefficient:** Not available.

**Odour threshold:** Not available.

**Viscosity:** 119 cps.

**Solubility in Water:** 0.48 g/L @ 25 °C (s-Metolachlor Technical).

## SECTION – 10: STABILITY AND REACTIVITY

**Chemical stability:** Stable under normal use and storage conditions.

**Conditions to avoid:** Excessive heat or cold.

**Incompatibility with other materials:** Certain plastics, particularly PVC, and rubber dissolve or soften in contact with S-metolachlor. Avoid strong oxidizing agents such as hydrogen peroxide, bromine, chromic acid. S-metolachlor is hydrolysed by strong alkalis and strong mineral acids.

**Hazardous decomposition products:** Can decompose at high temperatures forming toxic gases. Thermal decomposition products may include carbon monoxide, carbon dioxide, hydrogen cyanide, acetonitrile, oxides of sulfur, hydrogen sulphide, oxides of nitrogen and phosphorous.

**Hazardous polymerization:** Will not occur.

## SECTION – 11: TOXICOLOGICAL INFORMATION

### **Acute toxicity/Irritation Studies (Finished Product):**

Ingestion:	<u>Slightly Toxic</u> Oral (LD50 Rat):	2,149 mg/kg body weight
Dermal:	<u>Slightly Toxic</u> Dermal (LD50 Rabbit):	> 2,020 mg/kg body weight
Inhalation:	<u>Practically Non-Toxic</u> Inhalation (LC50 Rat):	> 3.8 mg/L air - 4 hours
Eye Contact:	<u>Moderately Irritating (Rabbit)</u>	
Skin Contact:	<u>Slightly Irritating (Rabbit)</u>	
Skin Sensitization:	<u>Not a Sensitizer (Guinea Pig)</u>	

### Reproductive/Developmental Effects

s-Metolachlor Technical: None observed.

### Chronic/Subchronic Toxicity Studies

s-Metolachlor Technical: None observed.

### Carcinogenicity

s-Metolachlor Technical: Benign liver tumors at high dose levels (female rats).

### Other Toxicity Information:

None.

### Toxicity of Other Components

Test results reported in Section 11 for the finished product take into account any acute hazards related to the excipient ingredients in the formulation.

Benoxacor ( $\leq 1\%$ ):

No additional information.

Naphthalene ( $\leq 1\%$ ):

Chronic overexposure to naphthalene can affect the liver, kidney, respiratory tract and blood.

Carcinogen Status:

NTP: Anticipated Carcinogen

IARC: Group 2B Possible Human Carcinogen

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

### Target Organs

#### Active Ingredient

s-Metolachlor Technical: Liver.

#### Inert Ingredients

Benoxacor: Not Applicable.

Naphthalene: Liver, blood, kidneys and respiratory tract.

## SECTION – 12: ECOLOGICAL INFORMATION

### Summary of Effects

DUAL II MAGNUM is a liquid herbicide emulsifiable concentrate mixed with water for weed control on corn, soybeans, certain fruits, vegetables and trees. The active ingredient, S-metolachlor, is practically nontoxic to birds and insects (bees), but toxic to fish and aquatic invertebrates (water flea).

### Eco-Acute Toxicity

s-Metolachlor Technical:

Bees LC <sub>50</sub> /EC <sub>50</sub>	> 200 µg/bee
Invertebrates ( <i>Daphnia magna</i> ) 48-hour LC <sub>50</sub> /EC <sub>50</sub>	26 ppm
Fish (Rainbow Trout) 96-hour LC <sub>50</sub> /EC <sub>50</sub>	12 ppm
Fish (Bluegill) 96-hour LC <sub>50</sub> /EC <sub>50</sub>	3.16 ppm
Birds (8-day dietary - Bobwhite Quail) LC <sub>50</sub> /EC <sub>50</sub>	> 5,620 ppm
Birds (8-day dietary - Mallard Duck) LC <sub>50</sub> /EC <sub>50</sub>	> 5,620 ppm
Bobwhite Oral LD <sub>50</sub>	> 2,510 mg/kg
Mallard Oral LD <sub>50</sub>	> 2,510 mg/kg

## Eco-Chronic Toxicity

S-Metolachlor Technical:

Fish (Fathead minnow) Reproduction/Early Life Stage NOEC	0.78 mg/L
Invertebrate ( <i>Daphnia magna</i> ) Life Cycle MATC	0.54 >MATC< 2.78 mg/L
Mallard Reproduction NOEC	800 ppm
Bobwhite Reproduction NOEC	800 ppm

## Environmental Fate

The active ingredient, S-metolachlor, has a low bioaccumulation potential, slight to moderate mobility in soil, and low to moderate persistence in soil and water. The dissipation half-life in soil is 14-30 days. The main route of degradation is by microbial degradation and formation of bound residues.

## 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.

## 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.: 25729

## 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.  
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