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

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MSDS prepared by:
Department of Regulatory & Biological Assessment
Syngenta Canada Inc.

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1-87-SYNGENTA (1-877-964-3682)

SECTION – 1: PRODUCT IDENTIFICATION

Product Identifier: REFLEX® Herbicide Formulation No.: A8339B
Registration Number: 24779 (Pest Control Products Act)
Chemical Class: Contact broadleaf herbicide.

Active Ingredient (%): Fomesafen Sodium Salt (21.7%) CAS No.: 108731-70-0
Chemical Name: 5-[2-chloro-4-(trifluoromethyl)phenoxy]-N-(methylsulfonyl)-2-nitrobenzamide, sodium salt.
Product Use: For selective post-emergence broadleaf weed control in soybeans, dry common beans, snap common beans. 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†
Sodium Hydroxide (CAS No. 1310-73-2)	2.0 mg/m ³ TWA	2.0 mg/m ³ STEL (ceiling) (irritation)	2.0 mg/m ³ TWA (ceiling)**	No	Yes
Fomesafen Sodium Salt (21.7%)	Not Established	Not Established	2.0 mg/m ³ TWA (based upon Fomesafen Technical)***	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

Corrosive to eyes. Causes skin irritation.

Hazardous Decomposition Products

Can decompose at high temperatures and form toxic gases.

Physical Properties

Appearance: Pale yellow liquid.

Odour: Mild amide odour.

Unusual Fire, Explosion and Reactivity Hazards

During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

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 15-20 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 plenty of water for 15-20 minutes. Call Syngenta, a poison control centre or doctor for treatment advice.
- INHALATION:** Move victim to fresh air. If not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call Syngenta, a poison control centre or doctor for treatment advice.
- INGESTION:** If swallowed, immediately contact Syngenta, a poison control centre, doctor or nearest hospital for treatment advice. Have person sip a glass of water if able to swallow. 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. . Treat symptomatically.

MEDICAL CONDITIONS KNOWN TO BE AGGRAVATED: None known.

SECTION – 5: FIRE FIGHTING MEASURES

Flash point and method: > 100 °C.

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

Auto-ignition temperature: Not applicable.

Flammability: Not flammable.

Hazardous combustion products: Thermal decomposition products are toxic and may include ammonia, halogens, halogen acids, oxides of carbon, nitrogen, sulphur and traces of carbonyl halide.

Conditions under which flammability could occur: Keep fire exposed containers cool by spraying with water.

Extinguishing media: Use foam, carbon dioxide, dry powder, halon extinguishant or water fog or mist, (avoid use of water jet). 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: None known.

Sensitivity to explosion by static discharge: None known.

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 equipment and clothing as described in Section 8 and/or the product label.

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, small amounts will naturally decompose. For large amounts, 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 disposal. Spillages or uncontrolled discharges into watercourses must be reported to the appropriate regulatory authority.

SECTION – 7: HANDLING AND STORAGE

Handling practices: KEEP OUT OF REACH OF CHILDREN. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. Avoid breathing vapours or spray mist. Wear full protective clothing and equipment (see Section 8). After work, rinse gloves and remove protective equipment, and wash hands thoroughly with soap and water after handling, and before eating, tobacco use, drinking, applying cosmetics or using the toilet. Wash contaminated clothing before re-use and separate from household laundry. Keep containers closed when not in use. Protect product, wash or rinse water, and contaminated materials from uncontrolled release into the environment, or from access by animals, birds or unauthorized people.

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. DO NOT STORE BELOW 0°C. 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: 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, apply cosmetics 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 gloves (such as nitrile or butyl), 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: Pale yellow liquid.
Formulation Type: Soluble concentrate.
Odour: Mild amide.
pH: 8.7 – 10.
Vapour pressure and reference temperature: Not available
Vapour density: Not available.
Boiling point: Not available.
Melting point: Not available.
Freezing point: - 5 °C.
Specific gravity or density: 1.11 g/mL @ 20°C.
Evaporation Rate: Not available.
Water/oil partition coefficient: Not available.
Odour threshold: Not available.
Viscosity: 4.9 cps @ 20 °C
Solubility in Water: Soluble.

SECTION – 10: STABILITY AND REACTIVITY

Chemical stability: Stable under normal use and storage conditions.
Conditions to avoid: None known.
Incompatibility with other materials: Acids.
Hazardous decomposition products: Thermal decomposition products are toxic and may include ammonia, halogens, halogen acids, oxides of carbon, nitrogen, sulphur and traces of carbonyl halide.
Hazardous polymerization: Will not occur.

SECTION – 11: TOXICOLOGICAL INFORMATION

Acute toxicity/Irritation Studies (Finished Product):

Ingestion:	<u>Low Acute Toxicity</u> Oral (LD50 Rat):	> 2,000 mg/kg body weight
Dermal:	<u>Low Acute Toxicity</u> Dermal (LD50 Rat):	> 2,000 mg/kg body weight
Inhalation:	<u>Low Acute Toxicity</u> Inhalation (LC50 Rat):	5.48 mg/L – 4 hours
Eye Contact:	<u>Corrosive (Rabbit)</u>	
Skin Contact:	<u>Mildly Irritating (Rabbit)</u>	
Skin Sensitization:	<u>Not a Sensitizer (Guinea Pig)</u>	

Reproductive/Developmental Effects

Fomesafen Sodium Salt:

Non-genotoxic with *in vitro* and *in vivo* assays. Hepatic changes and a small effect on reproductive performance seen in a 3-generation rat study at the 1000 ppm dose level (based on Fomesafen technical).

Chronic/Subchronic Toxicity Studies

Fomesafen Sodium Salt:

Liver effects seen at 10 ppm and 100 ppm in 90-day rat feeding studies and in 6-month dog studies at

25 mg/kg/d. No evidence of neurotoxicity from subacute or longer-term studies in mammals (based on Fomesafen technical).

Carcinogenicity

Fomesafen Sodium Salt:

Increased rates of malignant liver tumors in a 2-yr mouse feeding study (1000 ppm), but the results are not considered relevant to man (based on Fomesafen technical).

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.

Sodium Hydroxide:

Causes severe burns to eyes, skin, and respiratory tract resulting in pulmonary edema and lung inflammation. Exposure causes permanent eye damage. If ingested, can cause severe burns to mouth, throat and stomach and may be fatal.

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

Target Organs

Active Ingredient

Fomesafen Sodium Salt: Liver.

Inert Ingredients

Sodium Hydroxide: Skin, eye, respiratory tract, digestive tract.

SECTION – 12: ECOLOGICAL INFORMATION

Summary of Effects

REFLEX is mixed with water and applied as a spray for selective post-emergence broadleaf weed control in registered crops. The active ingredient, fomesafen, is practically nontoxic to birds and insects (bees) but highly toxic to aquatic organisms (invertebrates and fish).

Eco-Acute Toxicity

Fomesafen:

Green Algae 96-hour EC ₅₀	170 ppb
Bees LC ₅₀ /EC ₅₀ (Contact)	> 100 µg/bee
Invertebrates (Water Flea) LC ₅₀ /EC ₅₀	294 ppm
Fish (Trout) 96-hour LC ₅₀ /EC ₅₀	170 ppm
Fish (Bluegill) 96-hour LC ₅₀ /EC ₅₀	1,507 ppm
Birds (5-day dietary - Bobwhite Quail) LC ₅₀ /EC ₅₀	> 20,000 ppm
Birds (5-day dietary - Mallard Duck) LC ₅₀ /EC ₅₀	> 20,000 ppm

Eco-Chronic Toxicity

Fomesafen:

Invertebrate (Water Flea) 21-day LOEC	100 ppm
Fish (Sheepshead Minnow) 28-day LOEC	89 ppm

Environmental Fate

The active ingredient, fomesafen has a high mobility and is persistent in soil and water. It has a low bioaccumulation potential. Hydrolysis, evaporation and photolysis are not significant pathways for environmental dissipation . The main pathways for dissipation are microbial degradation and formation of bound residues. The soil dissipation half-life is 28-100 days.

For REFLEX, the bulk material sinks in water (after 24 h).

SECTION – 13: DISPOSAL CONSIDERATIONS

Waste disposal information: Do not reuse empty containers unless they are specifically designed to be re-filled. Empty container retains product residue. 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

This MSDS has been prepared in accordance with WHMIS requirements, but the data are presented under 16 headings.

Pest Control Products (PCP) Act Registration No.: 24779

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 Canada Inc.
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