MATERIAL SAFETY DATA SHEET

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

Date of MSDS Preparation (Y/M/D): 2017-03-01

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

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

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

Supersedes date (Y/M/D): 2014-03-01

SECTION – 1: PRODUCT IDENTIFICATION

Product Identifier: FLEXSTAR™ GT HERBICIDE
Formulation No.: A17898A

Registration Number: 30412 (Pest Control Products Act)

Chemical Classes: A mixture of a contact broadleaf and a phosphonic acid herbicide.

Active Ingredient (%): Fomesafen (5.5%)  CAS No.: 72178-02-0
Chemical Name: 5-[2-chloro-4-(trifluoromethyl)phenoxy]-N-(methylsulfonyl)-2-nitrobenzamide (sodium salt)
Chemical Class: Contact Broadleaf Herbicide

Active Ingredient (%): Glyphosate Acid (22.4%)  CAS No.: 69254-40-6
Chemical Name: N-(phosphonomethyl) glycine (diammonium salt).
Chemical Class: A phosphonic acid herbicide.

Product Use: For non-selective burndown of annual and perennial grass and broadleaf weeds and residual control of redroot pigweed and common ragweed in glyphosate tolerant soybeans. Please refer to product label for further details.

SECTION – 2 : COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Material</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
<th>Other</th>
<th>NTP/IARC/OSHA Carcinogen</th>
<th>WHMIS†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene Glycol (CAS # 57-55-6)</td>
<td>Not Established</td>
<td>Not Established</td>
<td>10 ppm TWA ****</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Fomesafen Sodium Salt</td>
<td>Not Established</td>
<td>Not Established</td>
<td>2.0 mg/m³ TWA (based upon Fomesafen Technical) ***</td>
<td>No</td>
<td>Not Established</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>Not Established</td>
<td>Not Established</td>
<td>10 mg/m³ TWA ***</td>
<td>No</td>
<td>Not Established</td>
</tr>
</tbody>
</table>

**  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.

SECTION – 3: HAZARDS IDENTIFICATION

Symptoms of Acute Exposure
Causes eye irritation.
**Hazardous Decomposition Products**

Flammable hydrogen gas may be formed on contact with incompatible metals. See "Conditions to Avoid", Section 10.

**Physical Properties**

Appearance: Brown liquid.
Odour: Odourless.

**Unusual Fire, Explosion and Reactivity Hazards**

This product may form flammable and explosive hydrogen gas when in contact with galvanized or unlined steel. During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

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

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**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.

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**SECTION – 5: FIRE FIGHTING MEASURES**

**Flash point and method:** > 107 °C.

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

**Auto-ignition temperature:** > 650°C.

**Flammability:** Not flammable.

**Hazardous combustion products:** Flammable hydrogen gas may be formed on contact with incompatible metals. See "Conditions to Avoid", Section 10.

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

**Extinguishing media:** Use foam, carbon dioxide, dry powder, halon extinguisher 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. Spray solutions of this product should be mixed, stored and applied using only plastic, plastic-lined steel, stainless steel or fiberglass containers. Concentrate should not be stored in galvanized steel, carbon steel, aluminum or unlined steel containers. 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, applying cosmetics 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, and away 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. DO NOT STORE BELOW -10°C. 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: 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.
SECTION – 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Brown liquid.
Formulation Type: Soluble concentrate.
Odour: Odourless.
pH: 6 (1% aqueous solution @ 25°C).
Vapour pressure and reference temperature: Fomesafen acid: < 3.0 x 10^-8 mmHg @ 20°C
                              Glyphosate acid: < 1.8 x 10^-7 mmHg @ 25°C
Vapour density: Not available.
Boiling point: Not available.
Melting point: Not applicable.
Freezing point: Not available.
Specific gravity or density: 1.21 g/mL @ 20°C.
Evaporation Rate: Not available.
Water/oil partition coefficient: Not available.
Odour threshold: Not available.
Viscosity: 28 mPas @ 20°C
Solubility in Water: Fomesafen salt: miscible
                          Glyphosate salt: 150 g/L

SECTION – 10: STABILITY AND REACTIVITY

Chemical stability: Stable under normal use and storage conditions.
Conditions to avoid: Concentrate should not be stored in galvanized steel, carbon steel, aluminum or unlined steel containers. Spray solutions should not be mixed, stored or applied in containers other than plastic, plastic-lined steel, stainless steel or fiberglass.
Incompatibility with other materials: See “Conditions to Avoid”, above.
Hazardous decomposition products: Flammable hydrogen gas may be formed on contact with incompatible metals. See "Conditions to Avoid”, above.
Hazardous polymerization: Will not occur.

SECTION – 11: TOXICOLOGICAL INFORMATION

Acute toxicity/Irritation Studies (Finished Product):

Ingestion: Low AcuteToxicity
Oral (LD50 Rat): > 5,000 mg/kg body weight
Dermal: Low AcuteToxicity
Dermal (LD50 Rat): > 5,050 mg/kg body weight
Inhalation: Low AcuteToxicity
Inhalation (LC50 Rat): > 2.69 mg/L – 4 hours
Eye Contact: Moderately Irritating (Rabbit)
Skin Contact: Non Irritating (Rabbit)
Skin Sensitization: Not a Sensitizer (Guinea Pig)

Reproductive/Developmental Effects:
Fomesafen:
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.

Glyphosate Acid:
No mutagenic or developmental effects seen in animal studies.

Chronic/Subchronic Toxicity Studies
Fomesafen:
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.

Glyphosate Acid:
Rat subchronic 90-day study - NOEL of 5,000 ppm (410 - 440 mg/kg). Body weight reduction, clinical chemistry changes. No evidence of neurotoxic effects in acute and subchronic rat studies (NOEL both studies 2,000 mg/kg). No evidence of delayed neurotoxic effects in hens (NOEL 2,000 mg/kg).

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

Glyphosate Acid:
Not genotoxic in Ames, mouse lymphoma, human lymphocyte and mouse micronucleus tests.

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.

Propylene Glycol:
Reported to cause central nervous system depression (anesthesia, dizziness, confusion), headache and nausea. Chronic dietary exposure caused kidney and liver injury in experimental animals.

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

Target Organs
Active Ingredient
Fomesafen: Liver.

Inert Ingredients
Propylene Glycol: CNS, kidney, liver

SECTION – 12: ECOLOGICAL INFORMATION

Summary of Effects
FLEXSTAR GT 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). The active ingredient, glyphosate, is toxic to plants, but since there are no uses involving direct application on water, the risk to aquatic non-target plants is low. Terrestrial non-target plants may be injured by spray drift, but there is no risk to plants when the product is applied following the label directions. The toxicity of glyphosate is low to moderate for fish, aquatic invertebrates (water flea), birds, and insects (bees).
Eco-Acute Toxicity

Fomesafen:
- Green Algae 96-hour EC50: 170 ppb
- Invertebrates (Water Flea) LC50/EC50: 294 ppm
- Fish (Trout) 96-hour LC50/EC50: 170 ppm
- Birds (5-day dietary - Bobwhite Quail) LC50/EC50: > 20,000 ppm
- Birds (5-day dietary - Mallard Duck) LC50/EC50: > 20,000 ppm

Glyphosate Technical:
- Green Algae 96-hour EbC50: 17 ppm
- Invertebrates (Water Flea) LC50/EC50: 130 ppm
- Fish (Trout) 96-hour LC50/EC50: 130 ppm
- Birds (8-Day Dietary - Bobwhite Quail) LC50/EC50: > 5,200 ppm
- Birds (8-Day Dietary - Mallard Duck) LC50/EC50: > 5,200 ppm

Environmental Fate

The active ingredient fomesafen has a high mobility and is moderately persistent in soil and water, with a dissipation half life of 28-100 days. The main route of degradation is by microbial degradation and formation of bound residues.

The active ingredient glyphosate has a low bioaccumulation potential, low mobility in soil, and low persistence in soil and water. The dissipation half-life in soil is 3 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 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

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.

Pest Control Products (PCP) Act Registration No.: 30412

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

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