



Safety Data Sheet

BroadStar® Herbicide

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: BroadStar® Herbicide
PCPA REGISTRATION NUMBER: 29229
VC NUMBER(S): 1453, 1836
SYNONYM(S): None
PRODUCT DESCRIPTION: Herbicide

BroadStar is a registered trademark of Valent U.S.A. Corporation

MANUFACTURER/DISTRIBUTOR

VALENT CANADA, INC.
3-728 Victoria Road South
Guelph, Ontario N1L 1C6

EMERGENCY TELEPHONE NUMBERS

HEALTH EMERGENCY OR SPILL (24 hr):
(800) 682-5368
TRANSPORTATION (24 hr.): CHEMTREC
(800) 424-9300 or (202) 483-7616

Product Information

AGRICULTURAL PRODUCTS: (800) 682-5368

The current MSDS is available through our website (www.valent.ca) or by calling the product information number(s) listed above.

2. HAZARDS IDENTIFICATION

Emergency Overview

- Caution**
- Harmful if absorbed through skin
 - Avoid contact with eyes, skin and clothing
 - Avoid breathing dust or spray mist
 - Keep out of reach of children

POTENTIAL HEALTH EFFECTS

Acute Toxicity (Primary Routes of Exposure): None known

Acute Eye Contact: This product is expected to cause minimal or no eye irritation. The expected adverse health effects resulting from an exposure may include redness and possibly some minor swelling.

Acute Skin Contact: This product may cause minor skin irritation and / or short term. If exposed, the expected adverse health effects may include irritation and possibly a slight inflammation.

This product may be slightly toxic when absorbed through the skin.

This product is not expected to cause allergic skin reactions.

Acute Ingestion: This product is expected to be minimally toxic when ingested.

Emergency Telephone: (800) 682-5368
REVISION NUMBER: 7

SDS NO.: CAN-0214
REVISION DATE: 12/09/2014

Acute Inhalation: This product is expected to be minimally toxic when inhaled. Exposure to high concentrations in the air may result in respiratory irritation. Signs and symptoms may include, but not be limited to, nasal discharge, sore throat, coughing and difficulty in breathing.

Chronic Toxicity (including cancer): Repeated exposures to Flumioxazin Technical in animals have produced anemia and other blood formation changes, organ weight changes and changes in blood chemistry. Flumioxazin Technical did not produce cancer in life-time feeding studies in laboratory animals.

Developmental Toxicity (birth defects): Birth defects were produced in the offspring of female rats exposed to Flumioxazin Technical. No effects were observed in rabbits.

Reproductive toxicity: Reproductive effects were observed in rats exposed to Flumioxazin Technical.

Signs and Symptoms of Systemic Effects: The toxicity of this product has not been fully assessed. The information provided is based on the technical material or a similar product.

No signs or symptoms occurred in animals exposed to high oral or dermal doses of Flumioxazin Technical. Exposure to very high concentrations of Flumioxazin Technical in the air resulted in breathing difficulties, decreased activity and some changes in the tissues of the respiratory system.

Potentially Aggravated Medical Conditions: Individuals with anemia or preexisting diseases of the blood may have increased susceptibility to the toxicity of excessive exposures.

For complete discussion of the toxicology data from which this evaluation was made, refer to Section 11. For Ecotox/Environmental Information, refer to Section 12. For Regulatory Information, refer to Section 15.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Weight/ Percent	Purpose
Flumioxazin (2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isoindole-1,3(2H)-dione)	103361-09-7	0.1 - 1	Active ingredient
Kaolin clay	1332-58-7	15 - 40	Carrier
Hydrated Amorphous Silica	112926-00-8	0.1 - 1	Flow aid
Others (including particulates not otherwise classified)	No CAS#	40 - 70	Other Ingredients

Other ingredients, which are maintained as trade secrets, are any substances other than an active ingredient contained in this product. Some of these may be hazardous, but their identity is withheld because they are considered trade secrets. The hazards associated with the other ingredients are addressed in this document. Specific information on other ingredients for the management of exposures, spills, or safety assessments can be obtained by a treating physician or nurse by calling **(800) 682-5368** at any time.

4. FIRST AID MEASURES

EMERGENCY NUMBER (800) 682-5368

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact **1-800-682-5368** for emergency medical treatment information.

Eye contact:

Hold eye 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 eye. Call a poison control centre or doctor for treatment advice.

Skin contact:

Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control centre or doctor for treatment advice.

Ingestion:

Call a poison control centre or doctor immediately for treatment advice. Have a person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control centre or doctor. Do not give anything by mouth to an unconscious person.

Inhalation:

Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control centre or doctor for further treatment advice.

Notes to physician:

None

5. FIRE FIGHTING MEASURES

FLASH POINT:	Not applicable
EXTINGUISHING MEDIA:	Water fog, carbon dioxide, foam, dry chemical
FLAMMABLE LIMITS IN AIR - LOWER (%):	Not applicable
FLAMMABLE LIMITS IN AIR - UPPER (%):	Not applicable

NFPA Rating:

Health:	1
Flammability:	1
Reactivity:	0
Special:	none

(Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using professional judgement. Values were not available in the guidelines or published evaluations prepared by the National Fire Protection Association, NFPA.

Hazardous decomposition products: None expected

6. ACCIDENTAL RELEASE MEASURES

VALENT EMERGENCY PHONE NUMBER: (800) 682-5368
CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300
OBSERVE PRECAUTIONS IN SECTION 8: PERSONAL PROTECTION

Stop the source of the spill if safe to do so. Contain the spill to prevent further contamination of the soil, surface water, or ground water. For additional spill response information refer to the **North American Emergency Response Guidebook**.

UN/NA Number: Not applicable **Emergency Response Guidebook No.:** Not applicable

FOR SPILLS ON LAND:

CONTAINMENT: Reduce airborne dust. Avoid runoff into storm sewers or other bodies of water.

CLEANUP: Clean up spill immediately. Vacuum or sweep up material and place in a chemical waste container. Wash area with soap and water. Pick up wash liquid with additional absorbent and place in a chemical waste container.

FOR SPILLS IN WATER:

CONTAINMENT: This material is insoluble in water. This material will sink to the bottom. Stop or reduce contamination of any water. Isolate contaminated water.

CLEANUP: Remove contaminated water for treatment or disposal.

7. HANDLING AND STORAGE

END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

Handling:

Avoid contact with eyes, skin or clothing. Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove and wash contaminated clothing before reuse.

Storage:

Keep pesticide in original container only. Do not store near food or feed. Store in a cool, dry, secure place. Do not put concentrate into food or drink containers. Do not dilute concentrate in food or drink containers. Not for use or storage in or around the home.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

EYES & FACE: Do not get this material in your eyes. Eye contact can be avoided by wearing protective eyewear.

RESPIRATORY PROTECTION: Use this material only in well ventilated areas. Unless ventilation is adequate to keep airborne concentrations below recommended exposure standards, approved respiratory protection should be worn.

This material may be a respiratory irritant and, unless ventilation is adequate, the use of approved respiratory protection is recommended. Use this material only in well ventilated areas.

SKIN & HAND PROTECTION: Do not get on skin or clothing. Skin contact should be minimized by wearing protective clothing including coveralls worn over short-sleeved shirt and short pants, socks, chemical-resistant footwear and chemical-resistant gloves. Remove contaminated clothing.

Exposure limits

Chemical Name	Canadian OELs
Flumioxazin (2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isoindole-1,3(2H)-dione)	none
Kaolin clay	none
Hydrated Amorphous Silica	none
Others (including particulates not otherwise classified)	none

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM:	Granule
COLOUR:	Gray
ODOUR:	Odourless
FLASH POINT:	Not applicable
MELTING POINT:	Not applicable
BOILING POINT:	Not applicable

BULK DENSITY:	0.778 g/ml (47 lb./cu. ft.)
DISSOCIATION CONSTANT:	Not applicable
pH:	8.3 @ 25°C (1% slurry)
CORROSION CHARACTERISTICS:	Not corrosive
SOLUBILITY:	Insoluble in water

10. STABILITY AND REACTIVITY

Chemical stability:	Stable at normal ambient temperatures.
Incompatibility:	This product is compatible with water, monoammonium phosphate (fire extinguishing agent), elemental zinc (reducing agent), and 1% (w/v) aqueous potassium permanganate (oxidizing agent).
Oxidation/Reduction properties:	Not an oxidizing or reducing agent.
Explosibility:	Not expected to be explosive
Hazardous decomposition products:	None expected

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

There is no toxicology information available for this specific formulation. The following information is for the technical material or a similar formulation.

Oral Toxicity LD ₅₀ (rats)	> 5000 mg/kg	EPA Tox Category	IV
Dermal Toxicity LD ₅₀ (rats)	> 2000 mg/kg	EPA Tox Category	III
Inhalation Toxicity LC ₅₀ (rats)	> 3.9 mg/L	EPA Tox Category	IV
Eye Irritation (rabbits)	Mildly irritating	EPA Tox Category	IV
Skin Irritation (rabbits)	Mildly irritating	EPA Tox Category	IV
Skin Sensitization (guinea pigs)	Non-sensitizer	EPA Tox Category	Not applicable

CARCINOGEN CLASSIFICATION

Chemical Name	IARC - Group 1 (carcinogenic to humans)	IARC - Group 2A (Probably carcinogenic)	IARC - Group 2B (Possibly carcinogenic)	NTP Carcinogen List
Flumioxazin (2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isoindole-1,3(2H)-dione)	no	no	no	Not listed
Kaolin clay	no	no	no	Not listed
Hydrated Amorphous Silica	no	no	no	Not listed
Others (including particulates not otherwise classified)	no	no	no	Not listed

TOXICITY OF FLUMIOXAZIN TECHNICAL:

Subchronic: Compound related effects of Flumioxazin Technical noted in rats following subchronic exposures at high dose levels were hematotoxicity including anemia, and increases in liver, spleen, heart, kidney and thyroid weights. In dogs, the effects produced at high dose levels included a slight prolongation in activated partial thromboplastin time, increased cholesterol and phospholipid, elevated alkaline phosphatase, increased liver weights and histological changes in the liver. The lowest no-observable-effect-level (NOEL) in subchronic studies was 30 ppm in the three-month toxicity study in rats.

Chronic/Carcinogenicity: In a one year dog feeding study, Flumioxazin Technical produced treatment-related changes in blood chemistry and increased liver weights at 100 and 1000 mg/kg/day. Minimal treatment-related histological changes were noted in the livers of animals in the 1000 mg/kg/day group. Based on these data the NOEL is 10 mg/kg/day. Dietary administration of Flumioxazin Technical for 18 months produced liver changes in mice of the 3000 and 7000 ppm groups. There was no evidence of any treatment-related oncogenic effect. The NOEL for this study is 300 ppm. Dietary administration of Flumioxazin Technical for 24 months produced anemia and chronic nephropathy in rats of the 500 and 1000 ppm groups. The anemia lasted throughout the treatment period, however, it was not progressive nor aplastic in nature. No evidence of an oncogenic effect was observed. The NOEL for this study is 50 ppm.

Developmental Toxicity: Flumioxazin Technical produces developmental toxicity in rats in the absence of maternal toxicity at doses of 30 mg/kg/day by the oral route and 300 mg/kg/day by the dermal route. The developmental effects noted consisted primarily of decreased number of live fetuses and fetal weights, cardiovascular abnormalities, wavy ribs and decreased number of ossified sacrococcygeal vertebral bodies. The developmental NOEL in the rat oral and dermal developmental toxicity studies were 10 and 100 mg/kg/day, respectively. The response in rabbits was very different from that in rats. No developmental toxicity was noted in rabbits at doses up to 3000 mg/kg/day, a dose well above the maternal NOEL of 1000 mg/kg/day.

Mechanistic studies indicate that the effects seen in the rat are highly unlikely to occur in the human and that flumioxazin would not be a developmental toxicant in the human.

Reproduction: Reproductive toxicity was observed in F1 males, P1 females and F1 females at 300 ppm Flumioxazin Technical, the highest dose tested and a dose that also produced signs of systemic toxicity. Toxicity was also observed in the F1 and F2 offspring at doses of 200 ppm and greater.

Mutagenicity: Flumioxazin Technical was not mutagenic in most *in vitro* assays: gene mutation and a chromosome aberration assay in the absence of metabolic activation. In three *in vivo* assays, chromosome aberration, unscheduled DNA synthesis and micronucleus assay, Flumioxazin Technical was not mutagenic. The only positive response was observed in the *in vitro* chromosome aberration assay in the presence of metabolic activation. Overall, Flumioxazin Technical does not present a genetic hazard.

For a summary of the potential for adverse health effects from exposure to this product, refer to Section 2. For information regarding regulations pertaining to this product, refer to Section 15.

12. ECOLOGICAL INFORMATION

AVIAN TOXICITY:

Based upon EPA designation, Flumioxazin Technical is practically non-toxic to avian species. The following results were obtained from studies with Flumioxazin Technical:

Oral LD₅₀ bobwhite quail: greater than 2250 mg/kg
Dietary LC₅₀ bobwhite quail: greater than 5620 ppm
Dietary LC₅₀ mallard duck: greater than 5620 ppm

No reproductive effects were observed in bobwhite quail exposed to 500 ppm Flumioxazin Technical in the diet. In mallard ducks, a slight, but not statistically significant reduction in hatchlings and 14-day old survivors was observed. Based on a possible, slight effect on egg production at 500 ppm, the NOEL for this study was 250 ppm.

AQUATIC ORGANISM TOXICITY: Based upon EPA designation, Flumioxazin Technical is slightly to moderately toxic to freshwater fish; moderately toxic to freshwater invertebrates; moderately toxic to estuarine/marine fish and moderately to highly toxic estuarine/marine invertebrates, based on the following tests:

96-hour LC₅₀ rainbow trout: 2.3 mg/L
 96-hour LC₅₀ bluegill sunfish: greater than 21 mg/L
 48-hour LC₅₀ Daphnia magna: 5.5 mg/L
 96-hour LC₅₀ sheepshead minnow: greater than 4.7 mg/L
 96-hour (shell deposition) EC₅₀ eastern oyster: 2.8 mg/L
 96-hour LC₅₀ mysid shrimp: 0.23 mg/L
 Fish early life-stage (rainbow trout): NOEC >7.7 µg/L, <16 µg/L
 Chronic toxicity (mysid shrimp): NOEC >15 µg/L, <27 µg/L
 Chronic toxicity (Daphnia magna): NOEC >52 µg/L, <99 µg/L

OTHER NON-TARGET ORGANISM TOXICITY:

Based upon EPA designation, Flumioxazin Technical is practically non-toxic to bees. The acute contact LC₅₀ to bees was greater than 105 µg/bee.

OTHER ENVIRONMENTAL INFORMATION:

This product is extremely toxic to fish and aquatic invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below mean high water mark. Do not apply where runoff is likely to occur. Do not apply where weather conditions favor drift from areas treated. Do not contaminate water when cleaning equipment or disposing of equipment washwater or rinsate.

13. DISPOSAL CONSIDERATIONS

END USERS MUST DISPOSE OF ANY UNUSED PRODUCT AS PER THE LABEL RECOMMENDATIONS.

PRODUCT DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Nonrefillable outer bag. Do not reuse or refill the outer bag. Completely empty bag into application equipment. Offer bag for recycling if available. If recycling is not available, then dispose of empty bag in a sanitary landfill or by incinerations, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

Disposal methods: Check government regulations and local authorities for approved disposal of this material. Dispose in accordance with applicable laws and regulations.

14. TRANSPORTATION INFORMATION

DOT (ground) shipping name: Not regulated for domestic ground transport by US DOT or Canada TDG.
Emergency Response Guidebook No.: Not applicable

ICAO/IATA proper shipping name: UN 3077 Environmentally Hazardous Substance, Solid, N.O.S. (Flumioxazin), 9, III, Marine Pollutant
Remarks: Single or inner packaging less than 5 L (liquid) or 5 Kg net (solids) excepted from Dangerous Goods regulations -- see UN Special Provision 375.

IMDG proper shipping name: UN 3077, Environmentally Hazardous Substance, Solid, N.O.S. (flumioxazin), Marine pollutant

EMS No.: F-A, S-F

15. REGULATORY INFORMATION

CANADIAN REGULATIONS:

WHMIS Hazard Class: Non-controlled

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations (CPR)* and the SDS contains all information required by the CPR.

Kaolin clay

Canada DSL Inventory List - Present

EINECS Inventory List - Present

Hydrated Amorphous Silica

Canada DSL Inventory List - Present

For information regarding potential adverse health effects from exposure to this product, refer to Sections 2 and 11.

PESTICIDE REGULATIONS: All pesticides are governed under PCPA (Pest Control Products Act). Therefore, the regulations presented below are pertinent only when handled outside of the normal use and applications of pesticides. This includes waste streams resulting from manufacturing/formulation facilities, spills or misuse of products, and storage of large quantities of products containing hazardous or extremely hazardous substances.

PROVINCIAL REGULATIONS: This product did not trigger any provincial regulations.

16. OTHER INFORMATION

REASON FOR ISSUE: Update MSDS. Correct Manufacturer/Distributor information. Updated trademark status.

SDS NO.: CAN-0214

PCPA REGISTRATION NUMBER: 29229

REVISION NUMBER: 7

REVISION DATE: 12/09/2014

SUPERCEDES DATE: January 30, 2012

RESPONSIBLE PERSON(S): Valent U.S.A. Corporation, Corporate EH&S, (925) 256-2803

This Safety Data Sheet (SDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE APPROVED PRODUCT LABELING (attached to and accompanying the product container). This SDS provides important health, safety, and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course.

Use, storage and disposal of pesticide products are regulated by the PMRA under the authority of the Pest Control Products Act through the product labeling. All necessary and appropriate precautionary, use, storage and disposal information is set forth on the labeling. It is a violation of Federal law to use a pesticide product in a manner not prescribed on the PMRA-accepted label.

Emergency Telephone: (800) 682-5368
REVISION NUMBER: 7

SDS NO.: CAN-0214
REVISION DATE: 12/09/2014

The information in this SDS is based on data available to us as of the revision date given herein, and believed to be correct. Contact Valent U.S.A. Corporation to confirm if you have the most current SDS.

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