

MATERIAL SAFETY DATA SHEET

Product Name: Genfarm Diflu-Brom Selective Herbicide

This revision issued: September, 2010

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Section 1 - Identification of The Material and Supplier

Landmark Operations Limited
Suite 2, Level 3, 64 Talavera Road
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Phone: (02) 9889 5400
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Chemical nature: Blend of Diflufenican and Bromoxynil in a suitable solvent system.
Trade Name: Genfarm Diflu-Brom Selective Herbicide
Product Use: Agricultural herbicide for use as described on the product label.
Creation Date: April, 2010
This version issued: September, 2010 and is valid for 5 years from this date.

Section 2 - Hazards Identification

Statement of Hazardous Nature

This product is classified as: Xn, Harmful. Xi, Irritating. N, Dangerous to the environment. Hazardous according to the criteria of SWA.

Not a Dangerous Good according to the Australian Dangerous Goods (ADG) Code. However, this is a C1 Combustible Liquid and for storage meets the definition of Dangerous Goods.

Risk Phrases: R20, R43, R63, R65, R20/21/22, R36/38, R50/53. Harmful by inhalation. May cause sensitisation by skin contact. Possible risk of harm to the unborn child. Harmful: May cause lung damage if swallowed. Harmful by inhalation, in contact with skin, and if swallowed. Irritating to eyes and skin. Very toxic to aquatic organisms, may cause long-term adverse effects to the aquatic environment.

Safety Phrases: S20, S23, S26, S28, S38, S46, S60, S61, S24/25, S36/37/39. When using, do not eat or drink. Do not breathe vapours or mists. In case of contact with eyes, rinse immediately with plenty of water and contact a doctor or Poisons Information Centre. After contact with skin, wash immediately with plenty of soap and water. In case of insufficient ventilation, wear suitable respiratory equipment. If swallowed, contact a doctor or Poisons Information Centre immediately and show this MSDS or label. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/Safety Data Sheets. Avoid contact with skin and eyes. Wear suitable protective clothing, gloves and eye/face protection.

SUSMP Classification: S6

ADG Classification: None allocated. Not a Dangerous Good under the ADG Code.

UN Number: None allocated

Emergency Overview

Physical Description & Colour: Clear yellow to dark brown liquid.

Odour: Characteristic estery odour.

Major Health Hazards: harmful by inhalation, in contact with skin, and if swallowed, irritating to eyes and skin, harmful if inhaled, possible skin sensitiser, possible risk of harm to the unborn child, if aspirated, may cause lung damage.

Potential Health Effects

Inhalation:

Short Term Exposure: Available data shows that this product is harmful, but symptoms are not available. In addition product may be mildly irritating, although unlikely to cause anything more than mild transient discomfort.

Long Term Exposure: No data for health effects associated with long term inhalation.

Skin Contact:

Short Term Exposure: Classified as a potential sensitiser by skin contact. Exposure to a skin sensitiser, once sensitisation has occurred, may manifest itself as skin rash or inflammation, and in some individuals this reaction can be severe. In addition product is a skin irritant. Symptoms may include itchiness and reddening of contacted skin. Other symptoms may also become evident, but all should disappear once exposure has ceased.

Long Term Exposure: No data for health effects associated with long term skin exposure.

Eye Contact:

Short Term Exposure: This product is an eye irritant. Symptoms may include stinging and reddening of eyes and watering which may become copious. Other symptoms may also become evident. If exposure is brief, symptoms

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should disappear once exposure has ceased. However, lengthy exposure or delayed treatment may cause permanent damage.

Long Term Exposure: No data for health effects associated with long term eye exposure.

Ingestion:

Short Term Exposure: Significant oral exposure is considered to be unlikely. Because of the low viscosity of this product, it may directly enter the lungs if swallowed, or if subsequently vomited. Once in the lungs, it is very difficult to remove and can cause severe injury or death. However, this product is an oral irritant. Symptoms may include burning sensation and reddening of skin in mouth and throat. Other symptoms may also become evident, but all should disappear once exposure has ceased.

Long Term Exposure: No data for health effects associated with long term ingestion.

Carcinogen Status:

SWA: No significant ingredient is classified as carcinogenic by SWA.

NTP: No significant ingredient is classified as carcinogenic by NTP.

IARC: No significant ingredient is classified as carcinogenic by IARC.

Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc,%	TWA (mg/m ³)	STEL (mg/m ³)
Diflufenican	83164-33-4	25g/L	not set	not set
Bromoxynil (as octanoate)	1689-99-2	250g/L	not set	not set
N-Methyl-2-pyrrolidone	872-50-4	150g/L	103	309
Liquid hydrocarbons	64742-94-5	428g/L	not set	not set
Other non hazardous ingredients	secret	to 100	not set	not set

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non hazardous ingredients are also possible.

The SWA TWA exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. The STEL (Short Term Exposure Limit) is an exposure value that may be equalled (but should not be exceeded) for no longer than 15 minutes and should not be repeated more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak" is used when the TWA limit, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:

You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 1126 from anywhere in Australia (0800 764 766 in New Zealand) and is available at all times. Have this MSDS with you when you call.

Inhalation: If symptoms of poisoning become evident, contact a Poisons Information Centre, or call a doctor at once. Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary oedema can be delayed up to 48 hours after exposure.

Skin Contact: Wash gently and thoroughly with warm water (use non-abrasive soap if necessary) for 10-20 minutes or until product is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g. watchbands and belts) and completely decontaminate them before reuse or discard. If irritation persists, repeat flushing and seek medical attention.

Eye Contact: Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes or until the product is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately. Take special care if exposed person is wearing contact lenses.

Ingestion: If swallowed, do NOT induce vomiting. Wash mouth with water and contact a Poisons Information Centre, or call a doctor.

Section 5 - Fire Fighting Measures

Fire and Explosion Hazards: This product is classified as a C1 combustible product. There is no risk of an explosion from this product under normal circumstances if it is involved in a fire. Violent steam generation or eruption may occur upon application of direct water stream on hot liquids. Vapours from this product are heavier than air and may accumulate in sumps, pits and other low-lying spaces, forming potentially explosive mixtures. They may also flash back considerable distances.

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Fire decomposition products from this product are likely to be toxic and corrosive if inhaled. Take appropriate protective measures.

Extinguishing Media: Suitable extinguishing media are carbon dioxide, dry chemical, foam, water fog.

Fire Fighting: If a significant quantity of this product is involved in a fire, call the fire brigade.

Flash point: 66°C

Upper Flammability Limit: No data.

Lower Flammability Limit: No data.

Autoignition temperature: No data.

Flammability Class: C1

Section 6 - Accidental Release Measures

Accidental release: In the event of a major spill, prevent spillage from entering drains or water courses. Wear full protective clothing including eye/face protection. All skin areas should be covered. See below under Personal Protection regarding Australian Standards relating to personal protective equipment. Suitable materials for protective clothing include rubber, Viton. Eye/face protective equipment should comprise as a minimum, protective goggles. If there is a significant chance that vapours or mists are likely to build up in the cleanup area, we recommend that you use a respirator. Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned below (section 8). Otherwise, not normally necessary.

Stop leak if safe to do so, and contain spill. Absorb onto sand, vermiculite or other suitable absorbent material. If spill is too large or if absorbent material is not available, try to create a dike to stop material spreading or going into drains or waterways. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage, and dispose of promptly. Recycle containers wherever possible after careful cleaning. Refer to product label for specific instructions. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. Full details regarding disposal of used containers, spillage and unused material may be found on the label. If there is any conflict between this MSDS and the label, instructions on the label prevail. Ensure legality of disposal by consulting regulations prior to disposal. Thoroughly launder protective clothing before storage or re-use. Advise laundry of nature of contamination when sending contaminated clothing to laundry.

Section 7 - Handling and Storage

Handling: Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this MSDS for details of personal protective measures, and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.

Storage: Note that this product is combustible and therefore, for Storage, meets the definition of Dangerous Goods in some states. If you store large quantities (tonnes) of such products, we suggest that you consult your state's Dangerous Goods authority in order to clarify your obligations regarding their storage.

Store in the closed original container in a dry, cool, well-ventilated area out of direct sunlight. Make sure that the product does not come into contact with substances listed under "Incompatibilities" in Section 10. Some liquid preparations settle or separate on standing and may require stirring before use. Check packaging - there may be further storage instructions on the label.

Section 8 - Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:

Respiratory equipment: **AS/NZS 1715**, Protective Gloves: **AS 2161**, Occupational Protective Clothing: AS/NZS 4501 set 2008, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

SWA Exposure Limits

TWA (mg/m³)

STEL (mg/m³)

N-Methyl-2-pyrrolidone

103

309

The ADI for Diflufenican is set at 0.2mg/kg/day. The corresponding NOEL is set at 16.3mg/kg/day.

The ADI for Bromoxynil is set at 0.003mg/kg/day. The corresponding NOEL is set at 0.3mg/kg/day. ADI means Acceptable Daily Intake; NOEL means No-observable-effect-level. Taken from Australian ADI List, Dec 2008.

No special equipment is usually needed when occasionally handling small quantities. The following instructions are for bulk handling or where regular exposure in an occupational setting occurs without proper containment systems.

Ventilation: This product should only be used in a well ventilated area. If natural ventilation is inadequate, use of a fan is suggested.

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Eye Protection: Protective glasses or goggles should be worn when this product is being used. Failure to protect your eyes may cause them harm. Emergency eye wash facilities are also recommended in an area close to where this product is being used.

Skin Protection: If you believe you may have a sensitisation to this product or any of its declared ingredients, you should prevent skin contact by wearing impervious gloves, clothes and, preferably, apron. Make sure that all skin areas are covered. See below for suitable material types.

Protective Material Types: We suggest that protective clothing be made from the following materials: rubber, Viton.

Respirator: Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned above. Otherwise, not normally necessary.

Eyebaths or eyewash stations and safety deluge showers should be provided near to where this product is being used.

Section 9 - Physical and Chemical Properties:

Physical Description & colour:	Clear yellow to dark brown liquid.
Odour:	Characteristic estery odour.
Boiling Point:	Not available.
Freezing/Melting Point:	No specific data. Liquid at normal temperatures.
Volatiles:	No data.
Vapour Pressure:	No data.
Vapour Density:	No data.
Specific Gravity:	1.078 at 20°C
Water Solubility:	Emulsifiable.
pH:	No data.
Volatility:	No data.
Odour Threshold:	No data.
Evaporation Rate:	No data.
Coeff Oil/water Distribution:	5.9 (Bromoxynil octanoate); 4.2 (Diflufenican); -0.46 (N-Methyl-2-pyrrolidone) (log P octanol/water)
Autoignition temp:	No data.

Section 10 - Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.

Conditions to Avoid: Store in the closed original container in a dry, cool, well-ventilated area out of direct sunlight.

Incompatibilities: strong acids, strong bases, strong oxidising agents.

Fire Decomposition: Carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Nitrogen and its compounds, and under some circumstances, oxides of nitrogen. Occasionally hydrogen cyanide gas in reducing atmospheres. Hydrogen fluoride gas and other compounds of fluorine. Water, bromine compounds. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death.

Polymerisation: This product will not undergo polymerisation reactions.

Section 11 - Toxicological Information

Local Effects:

Target Organs: There is no data to hand indicating any particular target organs.

Bromoxynil is classed as SWA Class 3 Reproductive risk, possible risk of harm to the unborn child as a potential sensitiser by skin contact.

Classification of Hazardous Ingredients

Ingredient	Risk Phrases
Bromoxynil	Conc>=25%: T; R63; R23; R22; R43
N-methyl-2-pyrrolidone	Conc>=10%: Xi; R36/38
Aromatic Hydrocarbons	Conc>=10%: Xn; R65
LD ₅₀ Oral, Rat 1113mg/kg	LD ₅₀ Dermal, Rat = >2000mg/kg
LC ₅₀ Inhalation, Rat = 0.72-0.81; >5.12mg/L/4hr	

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Acute toxicity: Technical Bromoxynil has an oral LD₅₀ of 190 mg/kg in rats, an LD₅₀ of 260 mg/kg in rabbits, and an LD₅₀ of 63 mg/kg in guinea pigs, indicating moderate acute toxicity. The dermal LD₅₀ of Bromoxynil is greater than 2000 mg/kg in rabbits. The compound is a slight eye irritant but it is not a skin irritant in rabbits. However, when in contact with abraded skin, Bromoxynil may produce a mild irritation.

Chronic toxicity: In one documented case of chronic exposure (about 1 year) of humans to Bromoxynil, workers showed symptoms of weight loss, fever, vomiting, headache, and urinary problems. Studies have shown that Bromoxynil has no effect on rats given dietary doses of 15 and 50 mg/kg/day for 90 days. Doses up to 5 mg/kg/day for 2 years had no impact on blood chemistry or urine.

Reproductive effects: No changes in reproduction were noted in female rats fed 15 mg/kg/day of Bromoxynil over three generations. This suggests that Bromoxynil does not cause reproductive effects.

Teratogenic effects: Bromoxynil is a suspected teratogen. The compound produced birth defects in rats at oral doses above 35 mg/kg. Toxic effects included abnormal rib formation and reduced foetal weight. Newborn rabbits had birth defects when Bromoxynil was administered to pregnant mothers at doses above 30 mg/kg. In the rabbit, birth defects included changes in bone formation in the skull and hydrocephaly.

Mutagenic effects: No data are currently available.

Carcinogenic effects: Rats fed Bromoxynil at low levels of 5 mg/kg and below did not develop any cancer related effects.

Organ toxicity: No data were available regarding the target organs affected by Bromoxynil.

Fate in humans and animals: No Bromoxynil was present in the milk or faeces of cows 9 days after exposure to low doses of the herbicide. Less than 20% of the compound was excreted in urine as the parent compound.

Diflufenican:

NOAEL: rat = 500 ppm or 25 mg/kg/day (2 years); mice = 500 ppm or 60-73 mg/kg/day (2 years)

NOEL : dog = 100 mg/kg/day

Chronic toxicity

Mutagenicity: Not mutagenic

Reproduction toxicity NOEL (rat) = 200 ppm (3 generation)

Teratogenicity: NOEL (rat) > 1,000 mg/kg/day

NOEL (rabbit) > 1,000 mg/kg/day

Section 12 - Ecological Information

Very toxic to aquatic organisms, may cause long-term adverse effects to the aquatic environment. This product is biodegradable. It will not accumulate in the soil or water or cause long term problems.

Diflufenican:

Mobility Low mobility.

Persistence/degradability Half-life time (t_{1/2}): 105-210 days.

Ecotoxicity :

Birds: Bobwhite quail LD₅₀ > 2,150 mg/kg

Mallard duck LD₅₀ > 4,000 mg/kg

Fish: LC₅₀ (96 hours) rainbow trout = 56-100 mg/L

carp = 105 mg/L

algae > 10 mg/L

LC₅₀ (48 hours) daphnia > 10 mg/L

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Birds: Low toxicity.

Bees: Not toxic.

Bromoxynil:

Breakdown in soil and groundwater: Bromoxynil has a low persistence in soil. In sandy soil, the half-life is about 10 days but is pH dependent (see below). Degradation in clay was slower, with half of the Bromoxynil degraded to its metabolites in about a 2-week period at 25°C. The persistence of the compound is also slightly longer in peat field soils than in the sandy soils. The evidence suggests that, while Bromoxynil is broken down by some soil bacteria, it may inhibit the action of other bacteria that promote the formation of nitrite by a process called nitrification.

Half life in soils: 34.1 at pH 5, 11.7 days at pH 7, 1.7 days at pH 9.

Breakdown in water: No data are currently available.

Breakdown in vegetation: The herbicide works by disrupting the plants ability to produce energy for cell-related activities. It is not readily translocated throughout the plant once it has been absorbed.

Section 13 - Disposal Considerations

Disposal: Special help is available for the disposal of Agricultural Chemicals. The product label will give general advice regarding disposal of small quantities, and how to cleanse containers. However, for help with the collection of unwanted rural chemicals, contact ChemClear 1800 008 182 <http://www.chemclear.com.au/> and for help with the disposal of empty drums, contact DrumMuster <http://www.drummuster.com.au/> where you will find contact details for your area.

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Section 14 - Transport Information

ADG Code: This product is not classified as a Dangerous Good. No special transport conditions are necessary unless required by other regulations.

Section 15 - Regulatory Information

AICS: All of the significant ingredients in this formulation are compliant with NICNAS regulations. The following ingredients: Bromoxynil, Aromatic hydrocarbons and N-Methyl-2-pyrrolidone, are mentioned in the SUSMP.

Section 16 - Other Information

This MSDS contains only safety-related information. For other data see product literature.

Acronyms:

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail (7 th edition)
AICS	Australian Inventory of Chemical Substances
SWA	Safe Work Australia, formerly ASCC and NOHSC
CAS number	Chemical Abstracts Service Registry Number
Hazchem Code	Emergency action code of numbers and letters that provide information to emergency services especially firefighters
IARC	International Agency for Research on Cancer
NOS	Not otherwise specified
NTP	National Toxicology Program (USA)
R-Phrase	Risk Phrase
SUSMP	Standard for the Uniform Scheduling of Medicines & Poisons
UN Number	United Nations Number

THIS MSDS SUMMARISES OUR BEST KNOWLEDGE OF THE HEALTH AND SAFETY HAZARD INFORMATION OF THE PRODUCT AND HOW TO SAFELY HANDLE AND USE THE PRODUCT IN THE WORKPLACE. EACH USER MUST REVIEW THIS MSDS IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE.

IF CLARIFICATION OR FURTHER INFORMATION IS NEEDED TO ENSURE THAT AN APPROPRIATE RISK ASSESSMENT CAN BE MADE, THE USER SHOULD CONTACT THIS COMPANY SO WE CAN ATTEMPT TO OBTAIN ADDITIONAL INFORMATION FROM OUR SUPPLIERS. OUR RESPONSIBILITY FOR PRODUCTS SOLD IS SUBJECT TO OUR STANDARD TERMS AND CONDITIONS, A COPY OF WHICH IS SENT TO OUR CUSTOMERS AND IS ALSO AVAILABLE ON REQUEST.

Please read all labels carefully before using product.

This MSDS is prepared in accord with the SWA document "National Code of Practice for the Preparation of Material Safety Data Sheets" 2nd Edition [NOHSC:2011(2003)]
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