

MATERIAL SAFETY DATA SHEET

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Date of Issue: December 2012
MSDS No. FMC/GLUF200/1

SECTION 1 IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: FMC Glufosinate 200 Herbicide

Other Names: Glufosinate, Glufosinate-Ammonium, a Group N Herbicide.
Use: An agricultural herbicide for control of broadleaf and grass weeds.
Company: FMC Australasia Pty Ltd.
Address: 5 Palmer Place, Murarrie, Qld 4172
Telephone Number: 07 3908 9222 **Fax Number:** 07 3908 9221
Emergency Telephone Number: 1800 033 111 (All hours - Australia wide).

SECTION 2 HAZARDS IDENTIFICATION

**Classified as Hazardous according to criteria of the Safe Work Australia.
Not classified as a Dangerous Good according to the ADG Code.**

Risk phrases: R21/22 Harmful in contact with skin and if swallowed.
R36 Irritating to eyes.
R48/20/22 Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R60 May impair fertility.
R63 Possible risk of harm to the unborn child.

Safety Phrases: S2 Keep out of reach of children.
S13 Keep away from food, drink, and animal feeding stuffs.
S24/25 Avoid contact with skin and eyes.
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S46 If swallowed, seek medical advice immediately and show this container or label.

SECTION 3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

CHEMICAL	CAS NUMBER	PROPORTION
Glufosinate ammonium	77182-82-2	200 g/L
1-methoxy-2-propanol	107-98-2	10 – 30%
Other ingredients (considered non-hazardous)		30 – 60%

SECTION 4 FIRST AID MEASURES

Ingestion: If swallowed do NOT induce vomiting; seek medical advice immediately and show this container or label, or contact the Poisons Information Centre phone Australia 13 11 26. Make every effort to prevent vomit from entering the lungs by careful placement of the patient. Do not give anything by mouth to a semi-conscious or unconscious person.

Skin: Remove contaminated clothing and launder before re-use. Wash affected areas thoroughly with soap and water. If irritation persists, seek medical advice.

Eye: If in eyes, hold eyelids open and wash with copious amounts of water for at least 15 minutes. Seek medical advice immediately if irritation develops or persists.

Inhalation: Remove affected person to fresh air until recovered. If symptoms develop or persist, seek medical advice.

SECTION 4 FIRST AID MEASURES (Continued)

Advice to Doctor: The treatment below may be warranted following ingestion of significant quantities of the concentrated product. Significant effects from exposure to dilute spray solution are unlikely. Glufosinate-ammonium is a glutamine synthase inhibitor and can interfere with neurotransmitter function. Early symptoms shortly after exposure are mainly gastrointestinal (nausea, diarrhoea, and vomiting, abdominal pain). In the course of time impaired respiration and neurological defects such as mental status changes, tremor, fever and convulsions may develop. Recovery is normally spontaneous, usually within 48 hours. As these symptoms may be delayed up to 48 hours after exposure, the patient should be admitted to hospital for at least 36 hours or 48 hours if a large amount has been ingested.

DECONTAMINATION

If ingested, endotracheal intubation and gastric lavage should be performed as soon as possible, followed by administration charcoal and sodium sulphate solution. Elimination by dialysis (forced alkaline diuresis) and/or haemo-perfusion must be conducted soon after ingestion to be effective.

ANTICONVULSANT THERAPY

Phenobarbital-sodium 1 mg/kg intramuscularly or subcutaneously until maximum 5 mg/kg daily; when necessary 10 mg diazepam slowly intravenously. Repeat as necessary until fully sedated.

Monitor respiratory, cardiac and central nervous systems, electrolyte balance (especially for hypokalemia) and signs of increased intracranial pressure; ECG (electrocardiogram); EEG (electroencephalogram).

CONTRAINDICATION

Atropine, as glufosinate-ammonium does not inhibit cholinesterase.

SECTION 5 FIRE FIGHTING MEASURES

Specific Hazard: Not flammable. Choose extinguishing media to suit the burning material. Contain all runoff.

Hazards from combustion products: Product is unlikely to decompose until heated to dryness. On further heating will emit toxic fumes. Firefighters to wear self-contained breathing apparatus and suitable protective clothing if risk to of exposure to vapour or smoke.

Precautions for fire-fighters and special protective equipment: Isolate fire area. Evacuate downwind. Wear full protective clothing and self-contained breathing apparatus. Do not breathe or contact smoke, gases or vapours generated.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Emergency procedures: Isolate and post spill area. Wear as a minimum, cotton overalls buttoned to the neck and wrist (or equivalent clothing) and a washable hat, elbow length PVC or nitrile gloves and face shield or goggles. Large spills should be dyked or covered to prevent dispersal. Vacuum, shovel or pump spilled material into an approved container and dispose of as listed below. Keep out unprotected persons and animals.

Material and methods for containment and cleanup procedures: To decontaminate spill area, tools and equipment, wash with detergent and water and add the solution to the drums of wastes already collected and label contents. Absorb, as above, any excess liquid and add both solutions to the drums of waste already collected. Dispose of drummed wastes, including decontamination solution in accordance with the requirements of Local or State Waste Management Authorities. Do NOT allow spilled product or wash solution to enter sewers, drains, dams, creeks or any other waterways.

SECTION 7 HANDLING AND STORAGE

Precautions for Safe Handling: Ensure containers are kept closed until using product. Harmful if absorbed by skin contact or swallowed. Will irritate the eyes and skin. Avoid contact with the eyes and skin. If product on skin, immediately wash area with soap and water. If product in eyes, wash out immediately with water. When opening the container, preparing spray and using the prepared spray, wear cotton overalls buttoned to the neck and wrist (or equivalent clothing) and a washable hat, elbow length PVC or nitrile gloves and face shield or goggles. Wash hands after use. After each day's use, wash gloves, face shield or goggles, and contaminated clothing.

SECTION 7 HANDLING AND STORAGE (Continued)

Conditions for Safe Storage: Store in the closed, original container in a dry, cool, well-ventilated, locked room or a place away from children, animals, food, feedstuffs, seed and fertilisers. Do not store for prolonged periods in direct sunlight. Do not store or use near naked flame, or heat sources. Do not cut or weld container.

Flammability: Not flammable under conditions of use. Not classified as a combustible liquid, as the boiling point (96°C) is less than the fire point (> 96°C). The product does not sustain combustion.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION**National Exposure Standards:**

No exposure guideline has been established for this product by safe Work Australia. However the following is an ingredient in this product:

Atmospheric Contaminant	Exposure Standard (TWA)	STEL (mg/m ³)
1-methoxy-2-propanol	369 mg/m ³ (100 ppm)	553 mg/m ³ (150 ppm)

TWA = Time-weight Average. STEL = Short Term Exposure Limit.

Biological Limit Values:

No biological limit allocated.

Engineering controls:

Use in ventilated areas adequate to keep exposure below the TWA. Keep containers closed when not in use.

Personal Protective equipment (PPE):

General: When opening the container, preparing spray and using the prepared spray, wear cotton overalls buttoned to the neck and wrist (or equivalent clothing) and a washable hat, elbow length PVC or nitrile gloves and face shield or goggles. Wash hands after use. After each day's use, wash gloves, face shield or goggles, and contaminated clothing.

Precautions: Will irritate the eyes and skin. Avoid contact with the eyes and skin. If product on skin, immediately wash area with soap and water. If product in eyes, wash out immediately with water.

Personal Hygiene: Wash hands after use. After each day's use, wash gloves, face shield or goggles, and contaminated clothing. Clean water should be available for washing in case of eye or skin contamination. Shower at the end of the workday.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Blue liquid.
Solubility in Water:	Soluble in water.
Specific Gravity:	1.1
pH Value:	4 – 6 (1% solution).
Vapour Pressure:	3.10 x 10 ⁻² mPa.
Volatile Component:	~40%
Octanol/Water Partition Coefficient:	Kow Log P is -4.01 (Glufosinate ammonium).
Boiling Point:	96°C.
Fire Point:	> 96°C.
Poison Schedule:	This product is a schedule 5 (S5) poison.

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: Product is considered stable in ambient conditions for a period of at least 2 years after manufacture.

Conditions to avoid: Do not store for prolonged periods in direct sunlight.

Incompatible materials: Keep away from strong alkali.

Hazardous decomposition products: Product is unlikely to decompose until heated to dryness. On further heating will emit toxic fumes.

SECTION 10 STABILITY AND REACTIVITY (Continued)

Hazardous reactions: Mixing with strong alkali (eg. Caustic soda) will cause the release of ammonia vapour. Polymerisation is unlikely.

SECTION 11 TOXICOLOGICAL INFORMATION

No specific data is available for this product as no toxicity tests have been conducted on this product. Information presented is our best judgement based on similar products and/or individual components. As with all products for which limited data is available, caution must be exercised through the use of protective equipment and handling procedures to minimise exposure.

Ingested: Early symptoms after exposure are mainly gastrointestinal (nausea, diarrhoea, vomiting, abdominal pain). In the course of time, impaired respiration and neurological defects such as mental status changes, tremor, fever and convulsions may develop. LD₅₀ (rat) = 2000 mg/kg for the product.

Skin: Symptoms of over-exposure may be similar to those described for ingestion. Mild skin irritant. LD₅₀ (rat) = 1400 mg/kg for the product. Product is not a skin sensitiser.

Eye: The concentrate will cause irritation of the eyes.

Inhalation: Symptoms of exposure by inhalation are similar to those described for ingestion. LC₅₀ (rat) >3 mg/L/4 hr.

Although most herbicides are not nerve poisons, glufosinate can affect the nervous system. Glutamate is an "excitatory" neurotransmitter in the brain, and it appears to affect some of the processes in the nervous system that normally involve glutamate.

Chronic toxicity: In animal studies glufosinate-ammonium showed no teratogenic, carcinogenic, mutagenic or neurotoxic effects.

Glufosinate-ammonium competitively inhibits glutamine synthetase in mammals. However, even at high (sub-lethal) doses, glutamate, ammonia and glutamine levels in brain, liver and kidney tissues were unaffected. No effect was seen on enzymes which have glutamate as a substrate nor on the metabolism of amino acids, glutathione or carbohydrates. The substance did not impair the oxidative metabolism in mitochondria *in vitro*.

Exposure to glufosinate during pregnancy negatively impacts the developing foetus in rabbits. The highest dose tested (20 mg/kg of body weight per day) caused a decrease in the number of mother rabbits with live foetuses. The frequency of premature delivery and miscarriages increased. An increase in the number of dead foetuses per litter was found in all treated rabbits. After reviewing the available *in vitro* and *in vivo* genotoxicity data, it was concluded that there was no evidence of genotoxicity.

SECTION 12 ECOLOGICAL INFORMATION

Environmental Toxicology: Glufosinate-Ammonium 200 Herbicide has low toxicity to birds for example the 8 day dietary LC₅₀ Japanese quail > 5000 mg/kg. Technical Glufosinate has low toxicity to fish and other aquatic organisms with LC₅₀ (96 h) rainbow trout 710 mg/L, LC₅₀ (96 h) carp, bluegill sunfish, golden orfe > 1000 mg/L. *Daphnia magna* EC₅₀ (48 h) 560 - 1000 mg/L and LD₅₀ for *Scenedesmus subspicatus* > 1000 mg/L LD₅₀ for *Scenedesmus capricornutum* 37 mg/L.

However formulated products are moderately toxic with LC₅₀ (96 h) rainbow trout 34 mg/L, *Daphnia magna* EC₅₀ (48 h) 26.8 mg/L and LD₅₀ (72 h) for *Desmodesmus subspicatus* 36 mg/L.

Environmental Properties: Glufosinate-ammonium is very soluble in water and is hydrolytically and photolytically stable. It is rapidly degraded in surface levels of soils and in water. Half-life (DT₅₀) in soil is typically 8 days. This product is considered to be readily biodegradable. The potential for groundwater contamination with glufosinate-ammonium is minimal. Glufosinate-ammonium does not accumulate in the fatty tissues of fish or other animals.

SECTION 13 DISPOSAL CONSIDERATIONS

Spills & Disposal: Isolate and post spill area. Wear cotton overalls buttoned to the neck and wrist (or equivalent clothing) and a washable hat, elbow length PVC or nitrile gloves and face shield or goggles. In case of spillage, contain and absorb spilled material with absorbent material such as clay, sand or cat litter. Large spills should be dyked or covered to prevent dispersal. Keep out animals and unprotected persons. Keep material out of streams and sewers. Vacuum, shovel or pump waste into an approved drum. To decontaminate spill area, tools and equipment, wash with detergent and water and add the solution to the drums of wastes already collected and label contents. Dispose of drummed wastes, including decontamination solution in accordance with the requirements of Local or State Waste Management Authorities.

Disposal of empty containers: Triple or preferably pressure rinse containers before disposal. Add rinsings to tank mix. Do not dispose of undiluted chemicals on-site. If not recycling, break, crush, or puncture and deliver empty packaging for appropriate disposal to an approved waste management facility. If an approved waste management facility is not available, bury the empty packaging 500 mm below the surface in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots, in compliance with relevant Local, State or Territory government regulations. DO NOT burn empty containers or product.

SECTION 14 TRANSPORT INFORMATION

Transport Information: It is good practice not to transport agricultural chemical products with food, food related materials and animal feedstuffs.

Storage and Transport: This product is not classified as a Dangerous Goods under the Australian Code for the Transport of Dangerous Goods by Road and Rail. This product is not classified as a Dangerous Good according to International Maritime Dangerous Goods (IMDG) Code and the International Air Transport Association (IATA).

SECTION 15 REGULATORY INFORMATION

Classified as a hazardous substance according to criteria of the Safe Work Australia. (Xn - Harmful, Xi - irritant).

Under the Standard for Uniform Scheduling of Medicines and Poisons (SUSMP), this product is a schedule 5 poison.

This product is registered under the Agricultural and Veterinary Chemicals Code Act 1994. Product Registration No. 67632.

Product is not classified as a Dangerous Good according to the ADG Code (7th Ed), IMDG and IATA.

Requirements concerning special training:

Check State or Territory regulations that require people who use pesticides in their job or business to have training in the application of the materials.

SECTION 16 OTHER INFORMATION

Issue Date: 19 December 2012. Valid for 5 years. (First issue).

Key to abbreviations and acronyms used in this MSDS:

ADG Code: Australian Dangerous Goods Code (for the transport of Dangerous Goods by Road and Rail).

ASCC: Australian Safety & Compensation Council (formally known as the National Occupational Health & Safety Commission (NOHSC)).

Carcinogen: An agent which is responsible for the formation of a cancer.

Genotoxic: Capable of causing damage to genetic material, such as DNA.

Lacrimation: The production, secretion, and shedding of tears.

Lavage: A general term referring to cleaning or rinsing.

NOHSC: National Occupational Health and Safety Commission.

Pneumonitis: A general term that refers to inflammation of lung tissue.

PPE: Personal protective equipment.

SECTION 16 OTHER INFORMATION (Continued)

Teratogen: An agent capable of causing abnormalities in a developing foetus.

TWA: The Time Weighted Average airborne concentration over an eight-hour working day, for a five day working week over an entire working life.

Safe Work Australia: Formally known as Australian Safety & Compensation Council (ASCC) which was formally known as the National Occupational Health & Safety Commission (NOHSC).

References

1. "Search Hazardous Substances". Safe Work Australia Council website. (2012).
2. "Approved Criteria for Classifying Hazardous Substances" 3rd Ed. NOHSC Australia. [NOHSC:1008 (2004)]. October 2004.
3. Standard for the Uniform Scheduling of Medicines and Poisons. No. 3. Medicines and Poisons Scheduling Secretariat. June 2012.

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 should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace including in conjunction with other products.

If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact this company.

End of MSDS