





# MATERIAL SAFETY DATA SHEET

**PRODUCT** : GLYPHOSATE  
**EFFECTIVE DATE** : October 2006  
**REVISION NO** : 2  
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**SUPPLIER** : NOVA AGRO (HK) LTD  
(Reg. No. 1023146)  
28/F Tesbury Centre  
28 Queen's Road East  
Wanchai  
HONG KONG

**Emergency Telephone Numbers**  
**Spillages** : 00263 4 704173

**Poisonings:**  
**Poison Info Centre** : (+27) 21-938 6084 (office hours)  
(South Africa) (+27) 21-931 6129 (after hours)

## 1. IDENTIFICATION OF THE SUBSTANCE

**Trade Name:** GLYPHOSATE  
**Active ingredient:** Glyphosate  
**Chemical Name:** N- (phosphonomethyl)glycine  
**CAS No:** 38641-94-0  
**Chemical Family:** Phosphanoglycine  
(Organophosphorous herbicide)  
Organophosphorous herbicides are structurally different from OP insecticides and their ACHE inhibiting power is very weak.  
**Chemical Formula:** C<sub>6</sub>H<sub>17</sub>N<sub>2</sub>O<sub>5</sub>P (Mol. wt.: 228.2)  
**NIOSH/RTECS no:** MC1075000  
**UN no:** 2902  
**Use:** Non-selective, systemic herbicide absorbed through the leaves.  
**Hazchem class:** 6.1

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

**Hazardous components:** Glyphosate  
**Symbols:** Not applicable  
**Risk-Phrase(S):** R 20/22, R 36

## 3. HAZARD IDENTIFICATION

**Main hazard:** Toxic if large amounts ingested.  
**Toxicity class:** WHO Table 5; EPA III.  
A low toxicity herbicide.  
**Flammability:** Gives off irritating or toxic fumes (gases) in a fire.  
**Biological hazards:** Skin contact, ingestion and inhalation.  
**Eye contact:** May cause moderate eye irritation.  
**Skin contact:** Minimally toxic. Non-irritating to skin.

**Ingestion:** Minimally toxic.  
**Inhalation:** Minimally toxic by inhalation.  
**Reproductive hazard:** See section 11.  
**Carcinogenicity:** See section 11.  
**Mutagenicity:** See section 11.  
**Neurotoxicity:** See section 11.

## 4. FIRST AID MEASURES AND PRECAUTIONS

**Organophosphorous herbicides are structurally different from OP insecticides and their ACHE-inhibiting power is very weak.**

Symptoms of glyphosate poisoning include: headache, lethargy, diarrhoea, weakness and collapse. Nausea after ingestion has been observed.

**Inhalation :**  
Remove source of contamination or move victim to fresh air. Keep person warm and at rest. Treat symptomatically and supportively. Obtain medical advice if necessary.

**Skin contact :**  
Remove contaminated clothing, shoes and leather goods. Gently wipe off excess chemical. Wash skin gently and thoroughly with water and non-abrasive soap. Seek medical advice if necessary.

**Eye contact :**  
Immediately flush the eyes with gently flowing lukewarm water or saline solution for 20 minutes, holding the eyelid(s) open. Seek medical attention if necessary.

**Ingestion:**  
Have victim rinse mouth thoroughly with water. Do not induce vomiting. Remove by gastric lavage and catharsis. Give oxygen if respiration is depressed. Do not perform gastric lavage if victim is unconscious. Administration of gastric lavage and oxygen should be performed by qualified medical personnel. Seek medical advice immediately showing container and label.

**Advice to physician:**  
There is no specific antidote. Treat symptomatically and supportively as and when required. Remove by gastric lavage and catharsis, but not if victim is unconscious. Give oxygen if respiration is depressed.

## 5. FIRE FIGHTING MEASURES

**Extinguishing agents:**  
Extinguish **small fires** with carbon dioxide, dry powder, or alcohol-resistant foam. Water spray can be used for **larger fires** or cooling of unaffected stock, but avoid the accumulation of polluted run-off from the site.



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### Firefighting:

Remove container from fire area if possible. Contain fire control water for later disposal. Use a recommended extinguishing agent for the type of surrounding fire.

Keep material out of sewers and water sources. Avoid inhalation of hazardous vapours. Keep upwind.

### Special hazard:

No fire hazard. Slight explosion hazard.

### Personal protective equipment:

Fire may produce irritating or poisonous vapours (toxic oxides of carbon, nitrogen and phosphorus), mists or other products of combustion. Fire-fighters and others that may be exposed should wear full protective clothing and self-contained breathing apparatus.

## 6. ACCIDENTAL RELEASE MEASURES

### (SPILLAGE)

#### Personal precautions:

Avoid contact with skin and eyes. Do not inhale fumes. For personal protection see Section 8.

#### Environmental precautions:

Do not allow to enter drains or water courses. When the product contaminates public waters, inform appropriate authorities in accordance with local regulations.

#### Small spills:

For small liquid spills, soak up with sand or other suitable noncombustible absorbent material, such as sawdust, and place into containers for subsequent disposal.

#### Large spills:

For large spills, contain liquid far ahead of spill. Contain spillage and contaminated water for subsequent disposal. Do not flush spilled material into drains. Keep spectators away.

## 7. HANDLING AND STORAGE REQUIREMENTS

### Handling:

Harmful by inhalation or if swallowed. Avoid contact with eyes, prolonged contact with skin, and inhalation of spray and fumes. Use with adequate ventilation. Wash hands before eating, drinking, chewing gum, smoking or using the toilet.

Remove clothing immediately if the herbicide gets inside. Then wash skin thoroughly using a non-abrasive soap and put on clean clothing. Do not apply directly to areas where surface water is present, or to intertidal areas below the mean high water mark. Water used to clean equipment must be disposed of correctly to avoid contamination.

### Storage:

Store in its original labeled container in shaded, well-ventilated area, away from heat, sparks and other sources of ignition. Do not store in galvanized steel or unlined steel containers. Not to be stored next to foodstuffs and water supplies. Keep out of

reach of children and animals. Local regulations should be complied with.

## 8. EXPOSURE CONTROL / PERSONAL PROTECTION

**Occupational exposure limits:** TLV not established.

**Engineering control measures:** It is essential to provide adequate ventilation. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. Ensure that control systems are properly designed and maintained. Comply with occupational safety, environmental, fire and other applicable regulations. If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment including approved respiratory protection.

### PERSONAL PROTECTIVE EQUIPMENT:

#### Respirator:

An approved respirator suitable for protection from dusts and mists of pesticides is adequate. Limitations of respirator use specified by the approving agency and the manufacturer must be observed.

#### Clothing:

Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.

#### Gloves:

Employee must wear appropriate synthetic protective gloves to prevent contact with this substance.

#### Eye protection:

The use of safety goggles is recommended.

**Emergency eye wash:** Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain or appropriate alternative within the immediate work area for emergency use.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance:** Clear golden yellow to amber liquid.

**Odour:** Mild halide odour.

**Explosive properties:** No thermal sensitivity.

**Oxidising properties:** None.

**pH:** 4.94 (1 % solution).

**Viscosity:** The mean measured viscosity range was:  
46.5 - 46.9 cP (25°C).  
19.7 - 20.2 cP (45°C).

**Surface tension:** 47.6 mN/m of a 1 g/l solution). The product is considered to be surface active.

#### Relative density:

1.1658 ± 0.0002 g/cm<sup>3</sup> at 20°C

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**Storage stability:** Stable for 2 years under normal warehouse conditions. Stable to light. Stable at 0°C and 54°C

**Suspensibility:** Not applicable.

**Dilution stability:** Stable in aqueous solutions at 20°C. During 18 hours, a 5% aqueous solution was homo-geneous and showed no phase separation

**Solubility in water:** Complete.

**Solubility in organic solvents:**

(Data for 62 % technical concentrate)

n-heptane: < 13.5 µg/l.

o-xylene: < 108 µg/l.

1,2-dichloroethane: < 13.5 µg/l.

methanol: 326 mg/l.

acetone: < 13.5 µg/l.

ethyl acetate: < 13.5 µg/l.

**Partition-coefficient in n-octanol / water:**

(Data for 62 % technical concentrate)

P<sub>ow</sub>: 0.0189 ± 0.0000629.

**Flash point:** None.

**Boiling point:** No data available.

## 10. STABILITY AND REACTIVITY

### Stability:

Stable under normal temperatures and pressures. Glyphosate reacts strongly (possibly violent exothermic reaction) with strong alkalis. Photodecomposition is negligible. Glyphosate is stable to light and also stable up to 60 °C. Glyphosate may be photolabile in natural waters, with calcium or other metal ions acting as catalysts for the process.

### Incompatibility:

Product is relatively stable in neutral, weakly acidic and weakly alkaline media, but reacts strongly (and possibly violently) with strong alkalis. Mixing with other products may reduce the activity of glyphosate.

### Hazardous decomposition products:

Toxic oxides of carbon, nitrogen and phosphorus are released when the product decomposes on heating.

## 11. TOXICOLOGICAL INFORMATION

**Acute oral LD<sub>50</sub> :** > 5 000 mg/kg in rats.

**Acute dermal LD<sub>50</sub> :** > 5 000 mg/kg in rats.

**Acute inhalation LC<sub>50</sub> (4 h):** 1.16 mg/l air for rats.

**Acute skin irritation:** The product is not irritating to skin (rabbit).

**Acute eye irritation:** The product is considered to be non-irritating, but an irritant for conjunctival redness.(rabbit).

**Dermal sensitisation:** The product is considered to be a dermal sensitiser (guinea pig).

**Carcinogenicity:** Animal studies did not detect any carcinogenic effects. No human information available.

**Teratogenicity:** Animal studies did not detect any teratogenic effects. No human information available.

**Mutagenicity:** Animal studies did not detect any mutagenic effects. No human information available.

## 12. ECOLOGICAL INFORMATION

### ECOTOXICOLOGY:

**Birds:** Low toxicity to birds. Acute oral LD<sub>50</sub>: > 2 00 mg/kg (bobwhite quail).

**Fish:** May pose a hazard to fish. LC<sub>50</sub> (96 hr): 35.9 mg/l (rainbow trout)

**Bees:** Non-toxic to bees.  
Oral LD<sub>50</sub> (72 h): >180µg formulation/bee.  
Dermal LD<sub>50</sub> (72 h): >200µg formulation/bee.

**Daphnia:** Very low toxicity to *Daphnia magna*.  
EC<sub>50</sub> (48 h): >71.8mg/l.

**Algae:** Low toxicity to *Selenastrum capricornutum*.  
EbC<sub>50</sub> (72 h): 1.4mg/l.  
ErC<sub>50</sub> (72 h): 1.8mg/l.

**Earthworms:** Not toxic to earthworms. LC<sub>50</sub> (14d): >1000 mg/kg of soil.

### Degradability:

Strongly adsorbed to soil and therefore becomes practically immobile. Microbial degradation is the major cause of loss from soil, with liberation of carbon dioxide. The principal metabolite is aminomethylphosphonic acid. In soil the half life of the product is less than 60 days.

### Mobility:

The product is practically immobile and is unlikely to leach.

### Accumulation:

The product shows little or no tendency to bioaccumulate and poses no long term threat to wildlife.

## 13. DISPOSAL CONSIDERATION

### Pesticide disposal:

Waste resulting from the use of this product that cannot be reused or reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable local procedures. Hydrolysis under alkaline conditions is a suitable method to dispose of small quantities of the product. After hydrolysis, dilute and dispose of in pits or landfill. Comply with any local legislation applying to waste disposal.

### Package product wastes:

Emptied containers retain vapour and product residues. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. Combustible containers should be



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disposed of in pesticide incinerators. Non-combustible containers must first be triple-rinsed with water, punctured and recycled or disposed of.

### 14. TRANSPORT INFORMATION

**UN NUMBER:** 2902  
**ADR/IRD:** Substance ID no. 2902 Hazard ID no. 60 Label: 6.1  
**IMDG/IMO:** Packaging group: III Label of class: 6.1 **Marine pollutant**  
**Shipping name:** Pesticide, liquid, toxic, n.o.s (Glyphosate)

#### AIR/IATA

Shipping name Pesticide, liquid, toxic, n.o.s (Glyphosate)

Class 6.1

Hazard Label Toxic

Packaging Group III

Passenger Aircraft 611 (max 60 litre)

Y611 (max 2 litre)

Cargo Aircraft 618 (max 220 litre)

**DOT classification** For DOT regulatory information, if required, consult transportation regulations or product shipping papers..

**Tremcard number** TEC(R)-61G43c

### 15. REGULATORY INFORMATION

**Symbol :** Not applicable

**Indication of danger:** Harmful.

**Risk phrases :**

**R 20/22** Harmful by inhalation or if swallowed.

**R 36** Irritating to eyes.

**Safety phrases:**

**S 2** Keep out of reach children.

**S 36/37/39** Wear suitable protective clothing, gloves and eye/face protection.

**S 45** In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**S 61** Avoid release to the environment.

**National legislation:** In accordance with 91/155/EEC Directive and with French standard T 01-102 and the South African Occupational Health and Safety Act, 1993 ( act. No. 85 of 1993)

### 16. OTHER INFORMATION

All information and instructions provided in this Material Safety Data Sheet (MSDS) are based on the current state of

scientific and technical knowledge at the date indicated on the present MSDS and are presented in good faith and believed to be correct. This information applies to the PRODUCT AS SUCH. In case of new formulations or mixes, it is necessary to ascertain that a new danger will not appear. It is the responsibility of persons in receipt of this MSDS to ensure that the information contained herein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. If the recipient subsequently produces formulations(s) containing this product, it is the recipients sole responsibility to ensure the transfer of all relevant information from this MSDS to their own MSDS.

### REFERENCES

- Applicable own physical and chemical, toxicity and ecotoxicity research studies.
- *The Pesticide Manual*; Tenth Edition; Editor Clive Tomlin; Crop Protection Publications, 1994.
- *Pestline*; Material Safety Data Sheets for Pesticides and Related Chemicals; Volume II; Occupational Health Services Inc., 1991.
- *MICROMEDEX, INC.*, Volume 34.