

Product name: **GLYFOS®**  
Active Ingredient: Glyphosate  
EPA Reg. No.: 4787-31

KEM/September 1999  
Supersedes issue dated March 1994  
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## MATERIAL SAFETY DATA SHEET

# GLYFOS®

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### 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY / UNDERTAKING

Product Name ..... **GLYFOS®**  
Material Use..... **Herbicide**  
Signal word..... **WARNING! AVISO!**  
EPA Reg. No. .... 4787-31  
Company ID ..... **CHEMINOVA A/S**  
P.O. Box 9  
DK-7620 Lemvig  
Denmark

**In the US:**  
**Cheminova, Inc.**  
1700 Route 23  
Wayne, NJ 07470

#### IN THE USA:

Emergency Medical Telephone Number	1-800-228-5635, Ext. #153
Other Emergencies in the US	CHEMTREC toll free 1-800-424-9300
Telephone Number for Information in the US	(973) 305-6600
Emergency Telephone Number in Denmark	(+45) 97835353 (Cheminova AS, Denmark)

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

#### 2.1. ACTIVE INGREDIENT:

**Glyphosate, in the form of its isopropylamine salt**

Chemical Name .....	<b>Glyphosate</b>
CAS Name.....	Glycine, N-(Phosphonomethyl)-
ISO Name .....	Glyphosate
CAS No. ....	1071-83-6
Molecular Weight .....	169.1
Empirical Formula .....	C <sub>3</sub> H <sub>8</sub> NO <sub>5</sub> P
Structural Formula .....	

<b>Glyphosate, isopropylamine salt</b>
Glycine, N-(phosphonomethyl)- compd. with 2-propanamine (1:1)
-
38641-94-0
228.2
C <sub>6</sub> H <sub>17</sub> N <sub>2</sub> O <sub>5</sub> P

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2.2. **TYPICAL CONTENT:**

Active Ingredient .....	Glyphosate, N-(phosphonomethyl)glycine*, in form of its isopropylamine salt .....	41.0%
Inert Ingredients .....	.....	59.0%

\* (Contains 480 g/l of the active ingredient glyphosate in the form of its isopropylamine salt. Equivalent to about 360 g/l of the acid, glyphosate)

<u>Component</u>	<u>CAS Reg. No.</u>
Ethoxylated Tallowamines**	61791-26-2
Glyphosate**	1071-86-6

\*\* Hazardous chemicals under the criteria of the OSHA Hazard Communication Standard (29 CFR §1910.1200)

**3. HAZARDS IDENTIFICATION**

3.1. Emergency Overview

Appearance and Odor.....  
Warning Statements.....

Clear, viscous amber-colored solution  
Keep Out of Reach of Children

**WARNING! AVISO!**

Si Usted no entiende la etiqueta, busque a alguien para que se la explique a Usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY  
HARMFUL IF SWALLOWED OR INHALED  
REFORMULATION IS PROHIBITED  
SEE INDIVIDUAL CONTAINER LABEL FOR REPACKING  
LIMITATIONS

3.2. Health Hazards (Acute and Chronic):

Likely Routes of Exposure.....

Eye Contact.....

Skin contact and inhalation.

**Glyfos®** may cause pain, redness and tearing based on toxicity studies.

Skin Contact.....

**Glyfos®** is no more than slightly toxic and no more than slightly irritating based on toxicity studies.

Ingestion.....

**Glyfos®** is no more than slightly toxic based on toxicity studies. No significant adverse health effects are expected to develop if only small amounts (less than a mouthful) are swallowed. Ingestion of similar formulations has been reported to produce gastrointestinal discomfort with irritation of the mouth, nausea, vomiting and diarrhea. Oral ingestion of large quantities of one similar product has been reported to result in hypotension and lung edema.

Inhalation.....

**Glyfos®** is no more than slightly toxic if inhaled based on toxicity studies.

3.2. Signs and Symptoms of Exposure....

See 3.1.

3.3. Environmental Hazards .....

See 12

**4. FIRST AID MEASURES**

4.1. Emergency and First Aid Procedures:

If in Eyes.....

Immediately hold eyelids open and flush with plenty of water for at least 15 minutes. Get medical attention.

If Swallowed .....

This product will cause gastrointestinal tract irritation. Immediately dilute by swallowing water or milk. Get medical attention.

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If Inhaled ..... Remove individual to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

**5. FIRE-FIGHTING MEASURES**

- 5.1. Extinguishing Media and Procedure Water spray, foam, dry chemical, carbon dioxide or any class B extinguishing agent.  
Fight fire upwind. Avoid heavy hose streams. Dike area to prevent water runoff. Firefighters and others that may be exposed to vapors, mists, or products of combustion should wear full protective clothing and self-containing breathing apparatus. Equipment should be thoroughly cleaned after use.
- 5.2. Hazardous Decomposition or Byproducts in a Fire ..... The essential breakdown products are carbon monoxide, carbon dioxide, phosphorus pentoxide, and nitrogen oxide.
- 5.3. Unusual Fire and Explosion Hazards None.

**6. ACCIDENTAL RELEASE MEASURES**

- 6.1. Personal Protection ..... Observe all protection and safety precautions when cleaning up spills - see 8.
- 6.2. Steps to be taken in Case of Spill **Small spills** on the floor or other impervious surface, should be soaked up with towels or other absorbent material and discard in the trash. Clean the spill area with soap and water and rinse the area thoroughly.  
**Large liquid spills** on the floor or other impervious surface should be contained or diked and then absorbed with attapulgate, bentonite or other absorbent clays. Collect the contaminated absorbent, place in a metal drum and dispose of in accordance with the instructions provided under Disposal (see 13). Thoroughly scrub floor or other impervious surface with a strong industrial detergent and rinse with water.  
Large spills that soak into the ground should be dug up, placed in metal drums and disposed of in accordance with instructions provided under Disposal (see 13). Contact appropriate state agency when considering a land spreading disposal option.  
Leaking containers should be separated from non-leakers and either the container or its contents transferred to a drum or other non-leaking container and disposed of in accordance with instructions provided under Disposal (see 13). Any recovered spill liquid should be similarly collected and disposed of.

**7. HANDLING AND STORAGE**

7.1 Precautions to be taken in Handling Do not get in eyes or on clothing. Avoid breathing vapor or spray mist. Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing (Personal Protection - see 8).

Spray solutions of the product should be mixed, stored or applied using only stainless steel, aluminium, fiberglass, plastic or plastic-lined containers. (materials to avoid - see 10.3)

**Do not mix, store or apply this product or spray solutions of this product in galvanized or unlined steel (except stainless steel) containers or spray tanks.**

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark.

Do not contaminate water when disposing of equipment washwaters.

7.2. Precautions to be taken in Storing ..... Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

7.3. Fire and Explosion Precautions ..... --

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

8.1. Eye Protection ..... Wear chemical splash goggles during mixing/pouring operations or other activities in which eye contact with undiluted **GLYFOS®** is likely to occur.

Skin Protection ..... Wear appropriate protective clothing to prevent skin contact. Applicators and other handlers must wear long-sleeved shirt, long pants, shoes plus socks and protective eyewear. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

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Respiratory Protection .....

**For handling of the undiluted product:** Undiluted **GLYFOS®** is not likely to present an airborne exposure concern during normal handling.

In the event of an accidental discharge of the material during manufacture or handling which produces a heavy vapor or mist, workers should use NIOSH/MSHA approved equipment. In work situation where an air purifying respirator is appropriate to be used, use of a full face respirator equipped with purifying elements for protection against organic vapor and dust/mist approved for pesticides is recommended. Use cartridges with NIOSH/MSHA approval number TC-14G.

Full facepiece replaces the need for chemical goggles. Observe respirator use limitation specified by the manufacturers. Respiratory protection programs must comply with 29 CFR §1910.134

**For application of product diluted in accordance with label instructions:** Respirators are not required for applications of use - dilutions of **GLYFOS®**.

Ventilation .....

No special precautions are recommended.

8.2. Exposure Guidelines .....

<u>Exposure Limits</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
<b>GLYFOS®</b>	None established	None established
Ethoxylated Tallowamine	None established	None established

**9. PHYSICAL AND CHEMICAL PROPERTIES**

- 9.1. Physical State ..... Clear, viscous solution
- 9.2. Color ..... Amber-colored
- 9.3. Odor ..... Practically odorless to slight amine-like odor
- 9.4. Specific Gravity ..... 1.17 (Water=1)
- 9.5. pH ..... 4.7 (1% solution)
- 9.6. Flash Point ..... >93°C (>200°F) (Pensky Martens closed tester)
- 9.7. Autoignition Temperature ..... Not determined
- 9.8. Flammable Limits ..... --

Note: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as guaranteed analysis of any specific lot or as specification items.

**10. STABILITY AND REACTIVITY**

- 10.1. Chemical Stability..... The product is stable for at least 5 years under normal conditions of warehouse storage.
- 10.2. Hazardous Decomposition or Byproducts ..... None (see, however, 5.2.).
- 10.3. Materials to Avoid .....

**Do not mix, store or apply this product or spray solutions of this product in galvanized or unlined steel (except stainless steel) containers or spray tanks.**

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This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarettes or other ignition source.

Hazardous Polymerization..... Does not occur. This product can react with caustic (basic) materials to liberate heat. This is not a polymerization but rather a chemical neutralization in an acid base reaction.

## 11. TOXICOLOGICAL INFORMATION

- 11.1. Health Hazards ..... See 3.
- 11.2. Toxicological Data: Data from laboratory studies conducted with **GLYFOS®** are summarized below. Single exposure (acute) studies indicate:
- Ingestion (oral) ..... Practically non-toxic (rat LD<sub>50</sub> above 5000 mg/kg). FIFRA Category IV
  - Skin (dermal) ..... Practically non-toxic (rabbit LD<sub>50</sub> above 5000 mg/kg). FIFRA Category IV
  - Inhalation ..... Slightly toxic (rat 4-hr LC<sub>50</sub> above 2.6 mg/l) FIFRA Category III.
  - Eye Irritation ..... Rabbits (6); 24-hr exp.; Slight to moderate irritation, eye irritation was evident at day 14 but cleared by day 21 after exposure in 1 animal; FIFRA Category II; EC: Corneal opacity -0.0, Iris - 0.0, Erythema - 1.7, Chemosis - 0.8.
  - Skin Irritation ..... Rabbits (6); 40hr exp.; Essentially non-irritation; Slight erythema (redness) clearing in all animals within 24 hours; FIFRA Category IV; EC: Erythema - 0.0, Edema - 0.0.
  - Allergy ..... No skin allergy was observed in guinea pigs following repeated skin exposure.

### 11.3 COMPONENTS

Data from laboratory studies conducted with **GLYFOS®** and from scientific literature on components of **GLYFOS®**.

#### 11.3.1 Isopropylamine Salt of Glyphosate

Data from studies with a formulation comprised of 62% isopropylamine salt of glyphosate indicate the following:

In repeat dosing studies (6-month), dogs fed this formulation exhibited slight body weight changes. Following repeated skin exposure (3-week) to this formulation, skin irritation was the primary effect in rabbits.

Additional toxicity information is available on glyphosate, the active ingredient of this formulation.

Following repeated exposure (90-days) to glyphosate in their feed, decreased weight gains were noted at the highest test level in mice, while no treatment-related effects occurred in rats.

Following repeated skin exposure (3 weeks) to glyphosate, slight skin irritation was the primary effect observed in rabbits. No skin allergy was observed in guinea pigs following repeated skin exposure.

There was no evidence of effects on the nervous system, including delayed effects in chickens (repeat oral doses) or cholinesterase inhibition in rats (single oral doses).

Reduced body weight gain and effects on liver tissues were observed with long-term (2-year) feeding of glyphosate to mice at high-dose levels.

Reduced body weight gain and eye changes were observed at the high-dose level in one long-term (2 year) feeding study with rats, while no treatment-related effects occurred in a second study.

No adverse effects were observed in feeding studies with dogs. Glyphosate did not produce tumors in any of these studies.

**Based on the results from the chronic studies, EPA has classified glyphosate in category E (evidence of non-carcinogenicity for humans).**

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No birth defects were noted in rats and rabbits given glyphosate orally during pregnancy, even at amounts which produced adverse effects on the mothers.

Glyphosate was fed continuously to rats at very high dose levels for 2 successive generations. Toxicity was reported in offspring from the high dose, a level which also produced adverse effects on the mothers.

In a 3 generation study conducted at lower dose levels, no effects were seen on the ability of male or female rats to reproduce.

Glyphosate has produced no genetic changes in a variety of standard tests using animals and animal or bacterial cells.

#### 11.3.2 Ethoxylated Tallowamine

The surfactant component of **GLYFOS®** is reported to cause irritation to the eyes and skin and may contribute to the irritation potential reported for this herbicide. Ingestion may produce gastrointestinal irritation, nausea, vomiting and diarrhea.

### 12. ECOLOGICAL INFORMATION

**GLYFOS®** has been shown to be slightly to moderately toxic in aquatic studies. **GLYFOS®** has been shown to be practically non-toxic to avian species following subacute dietary exposure.

Rainbow Trout 96-hr LC <sub>50</sub> .....22 mg/L (static)	Fathead Minnow 96-hr LC <sub>50</sub> .....9.4 mg/L
Rainbow Trout 96-hr LC <sub>50</sub> .....8.2 mg/L (dynamic)	Channel Catfish 96-hr LC <sub>50</sub> .....16 mg/L
<i>Daphnia Magna</i> 48-hr EC <sub>50</sub> .....37 mg/L (aeration)	Chinook Salmon 96-hr LC <sub>50</sub> .....20 mg/L
<i>Daphnia Magna</i> 48-hr EC <sub>50</sub> .....24 mg/L (without aeration)	Coho Salmon 96-hr LC <sub>50</sub> .....22 mg/L
Bluegill Sunfish 96-hr LC <sub>50</sub> .....5.8 mg/L (dynamic)	Algae s. <i>Capricornutum</i> 72-hr EC <sub>50</sub> ...2.1 mg/L
Bluegill Sunfish 96-hr LC <sub>50</sub> .....14 mg/L (static)	Bobwhite quail 8-day LC <sub>50</sub> .....>6300 ppm
<i>Gammarus pseudolimnaeus</i> 48-hr EC <sub>50</sub> ....42 mg/L	Mallard Duck 8-day LC <sub>50</sub> .....>6300 ppm

### 13. DISPOSAL CONSIDERATIONS

Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned or destroyed. **DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER.**

Plastic Containers ..... Do not reuse container. Triple rinse container. Then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

### 14. TRANSPORT INFORMATION

IMDG.....	Not applicable
RID/ADR.....	Not applicable
ICAO/IATA.....	Not applicable
UN No. ....	Not applicable
Proper Shipping Name.....	Not applicable
DOT Proper Shipping Name.....	Not applicable
DOT Hazard Class/ID No. ....	Not applicable
DOT Label .....	Not applicable
US Surface Freight Classification.....	Weed killing compound, N.O.I.B.N

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**15. REGULATORY INFORMATION**

SARA Hazard Notificaiton:  
Hazard Categoioes Under Criteria of SARA Title II Rules (40 CFR Part 370)..Immediate  
Section 313 Toxic Chemical(s).....Not applicable  
Reportable Quantity (RQ) under U.S. CERCLA.....Not applicable  
TSCA Inventory.....All components are on the US  
EPA's TSCA Inventory List

**16. OTHER INFORMATION**

This MSDS is intended for worker and transport safety. It is not intended for users of the product who should refer to the product label for safety precautions applicable to them. Some safety equipment and procedure recommendations in this MSDS differ from the product label because they are intended for a different audience.

This material should handled be used by persons who are made aware of its hazardous properties and have been instructed in the required safety precautions.

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