GLYFOS PRO HERBICIDE

Revision Date: January 16, 2004

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

Product identifier: GLYFOS PRO HERBICIDE
Product use: Herbicides.
Supplier's name and address:
Cheminova Inc.
1700 Route 23, Suite 300
Wayne, NJ, USA
07470
Phone #: (973) 305-6600 (8 AM to 5:00 PM EST, Monday to Friday)
Emergency Telephone #:
1-866-303-6950 (Medical Emergencies)
1-800-424-9300 (24 Hr. Chemtrec Number)
Manufacturer's name and address:
Refer to supplier.
MSDS Prepared by: Cheminova Inc.
MSDS Preparation date: August 19, 2003
Revision date: January 16, 2004
Revision reasons: Refer to Section 16.

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	CAS #	% (weight)	ACGIH TLV (mg/m^3)	OSHA PEL (mg/m^3)
*Glyphosate as iso-propylamine salt	38641-94-0	30 - 60	N/Av	N/Av
Ethylene glycol	107-21-1	0.1 - 1.0	100 (ceiling)	127 (ceiling - final rule limit)

*Note: The product contains about 480 g/L (4.00 lb/gal) of the active ingredient Glyphosate as its isopropylamine salt, equivalent to 360 g/L (3.00 lb/gal) of the free acid Glyphosate (CAS # 1071-83-6).
This material is classified as hazardous under OSHA regulations (29CFR 1910.1200).

SECTION 3 — HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Clear, yellow, liquid, slight amine-like odor.
Caution! Combustible liquid and vapor. Reacts with materials made of iron, galvanized steel and unlined steel, liberating (releasing) hydrogen, which may ignite. May cause eye irritation. Contains material which may cause liver and kidney effects.
Possible birth defect hazard. Contains material that may cause birth defects, based on animal data.
May be dangerous for the environment. May be toxic to flora (plants). May be harmful to aquatic organisms. In case of fire, use water fog, dry chemical, CO_2 or 'alcohol' foam. Water may be ineffective.
*****POTENTIAL HEALTH EFFECTS*****
Target organs: Eyes, skin, respiratory system, digestive system.
Signs and symptoms of short-term (acute) exposure:
Inhalation: Inhalation may cause irritation to the nose, throat and upper respiratory tract. Symptoms may include coughing and sneezing
Skin contact: Direct skin contact may cause slight irritation.
Eye contact: Direct eye contact may cause mild irritation and reversible eye injury. Symptoms may include pain, redness and tearing.
Ingestion: This product is not expected to be harmful by oral administration route. Ingestion of large amounts could cause irritation. Symptoms may include nausea, vomiting and diarrhea.
Effects of long-term (chronic) exposure: Prolonged or repeated overexposure may cause liver and kidney effects.
Carcinogenicity: See TOXICOLOGICAL INFORMATION (Section 11).
Other important hazards: See TOXICOLOGICAL INFORMATION (Section 11).
Potential environmental effects: This product is a herbicide and may be toxic to all green plants. The product may also be harmful to fish, aquatic invertebrates and aquatic plants. See ECOLOGICAL INFORMATION (Section 12).

SECTION 4 — FIRST AID MEASURES

Inhalation: Immediately remove victim to fresh air. Obtain medical attention if irritation develops or persists.
Skin: Wash skin with soap and running water, while removing contaminated clothing and shoes. Get medical attention if irritation develops or persists. Thoroughly clean contaminated clothing before re-use.
Eyes: Immediately flush eyes with running water for at least 15 minutes. Get medical attention.
Ingestion: If ingested, do not induce vomiting. Have victim drink 6 to 8 ounces of water. Never give anything by mouth if victim is unconscious or convulsing. Obtain medical attention.

SECTION 5 — FIRE FIGHTING MEASURES

Fire hazards/conditions of flammability: Combustible liquid. This material may burn when exposed to extreme heat, flame and other ignition sources. Closed containers may build up pressure if exposed to excess heat. Product can react with iron, galvanized steel or unlined steel to produce flammable hydrogen gas. Flammable hydrogen gas can produce a highly combustible mixture with air and this mixture could flash or explode if ignited by heat, sparks and flame.
Flammability classification (OSHA 29 CFR 1910.1200): Class IIIA Combustible Liquid.
Flash point (Method): >158˚F / 70˚C (PMCC).
Lower flammable limit (% by volume): N/Av
Upper flammable limit (% by volume): N/Av
Explosion data:
Sensitivity to mechanical impact: Not sensitive.
Sensitivity to static discharge: Not expected to be sensitive to static discharge.
Auto-ignition temperature: N/Av
Suitable extinguishing media: For small fires, use dry chemical or carbon dioxide. For large fires, use water spray or foam.
Special fire-fighting procedures/equipment: Firefighters should wear proper chemically protective equipment and self-contained breathing apparatus operated in positive pressure mode. Move containers from fire area if it can be done without risk. Dike area to prevent water run-off. Water spray may be useful in cooling equipment and containers. Avoid spreading burning material with water jet.
Hazardous combustion products: Carbon oxides, nitrogen oxides, phosphorous oxides.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Personal precautions: Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate chemically protective equipment. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.
Environmental precautions: Ensure spilled product does not enter drains, sewers, waterways, or confined spaces.
Spill response/Cleanup: Eliminate all sources of heat, sparks and flame. Ventilate area of release. Stop leak if you can do so without risk. For spills on the floor or other impervious surfaces, absorb spill with inert, non-combustible absorbent material, such as hydrated lime, Fuller's earth or other absorbent clays. Scoop up and place contaminated absorbent material into suitable containers for later disposal (see Section 13). Clean the spill area with soap and water, then rinse thoroughly. Do not flush to sewer or allow to enter confined spaces. Large spills that soak into the ground should be dug up, placed in suitable containers and disposed of appropriately (see Section 13). Notify the appropriate authorities.
Prohibited materials: Do not use containers made of iron, galvanized steel or unlined steel.
Special spill response procedures: If a spill/release in excess of EPA reportable quantity is made into the environment, immediately notify the national response center (phone: 1-800-424-8002).
EPA/CERCLA Reportable quantity:
5000 lbs (Ethylene glycol, CAS # 107-21-1).
100 lbs (p-Dioxane, CAS # 123-91-1)
10 lbs (Ethylene oxide, CAS # 75-21-8)
1000 lbs. (Acetaldehyde, CAS # 75-07-0)

SECTION 7 — HANDLING AND STORAGE

Safe handling procedures: This material is a harmful liquid. Wear appropriate protective equipment during handling. Use only in well ventilated area. Avoid contact with eyes, skin and clothing. Do not inhale vapors or mists. Keep away from all unprotected persons and children. Do not use near sources of heat, flame or ignition sources. **This product should be mixed, stored or applied using only stainless steel, fibreglass, plastic or plastic-lined containers and equipment.** This product can react with containers made of iron, galvanized steel and unlined steel to produce flammable hydrogen gas which may form a highly combustible gas mixture with air. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Keep away from bases and incompatibles. Use caution when opening containers. Keep container tightly closed when not in use. Wash thoroughly after handling.
Storage recommendations: Store in a cool, dry, well ventilated area away from incompatibles. Protect container from physical damage. No smoking in the area. Inspect containers periodically for damage or leaks.
Special packaging materials: Always keep in containers made of the same materials as the supply container.

SECTION 8 — EXPOSURE CONTROLS AND PERSONAL PROTECTION

Ventilation and engineering controls: If handled indoors, general room ventilation may not be sufficient. Provide mechanical exhaust ventilation to keep concentrations below specified TLV's and PEL's.
Respiratory protection: This product is not likely to present an airbourne exposure concern during normal handling. In the event of an accidental discharge of the material during manufacturing or handling, which produces a heavy vapor or mist, workers should put on respiratory protection. Wear respirators approved by MSHA / NIOSH. Advice should be sought from respiratory protection specialists.
Protective gloves: Wear impervious chemical gloves, such as barrier laminate, butyl rubber, nitrile rubber or viton. Advice should be sought from glove suppliers.
Eye protection: Wear safety glasses with side shields or chemical splash goggles to prevent vapors or mists from entering the eyes. If using a full face shield, always use safety glasses or goggles along with the face shield to ensure adequate protection of the eyes.
Other protective equipment: Wear appropriate protective clothing to prevent skin contact. Other protective equipment, such as an eyewash station and safety shower, may be required depending on exposure and on workplace standards.
Permissible exposure levels: See Section 2.
General hygiene considerations: Avoid breathing vapors or mists. Avoid contact with eyes, skin and clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Remove contaminated clothing and wash before re-use.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Physical state, odor and appearance: Clear, yellow, liquid, slight amine-like odor.
Odor threshold: N/Av
Specific gravity (water = 1): 1.163 g/cm^3 @ 68˚F/20˚C.
Solubility in water: The product is miscible with water (solubility free Glyphosate acid: 10.5 g/L @ 68˚F/20˚C).
pH: 5.09 @ 68˚F / 20˚C (1% aqueous solution).
Boiling point: >212˚F / 100˚C
Melting/freezing point: <32˚F / 0˚C.
Vapour density (Air=1.0): N/Ap
Percent Volatile by Weight: N/Av
Evaporation rate (n-BuAc=1.0): N/Av
Vapour pressure: 1.75×10^{-7} mmHg (1.31×10^{-5} Pa) @ 77˚F / 25˚C (free Glyphosate acid).

Coefficient of n-Octanol/water distribution: P = 4.5 $\times$ 10^{-4} (free Glyphosate acid); Log P = -3.3 (free Glyphosate acid)
Viscosity: 22 centistokes @ 68˚F/20˚C; 11.5 centistokes @ 104˚F / 40˚C.

SECTION 10 — REACTIVITY AND STABILITY DATA

Stability and reactivity: This product is stable at ambient temperatures. This product can react with containers made of iron, galvanized steel and unlined steel to produce flammable hydrogen gas which may form a highly combustible gas mixture with air. This gas mixture could flash or explode when exposed to heat, sparks, flame, welder's torch, lighted cigarettes or other ignition sources.
Hazardous polymerization: Hazardous polymerisation does not occur. The product does react with caustic (alkaline) materials to liberate heat, however this is an acid-base neutralization reaction and is not polymerisation.
Conditions to avoid: Avoid heat, flame and direct sunlight.
Materials to avoid (incompatibles): Alkalies, iron, galvanized steel and unlined steel.
Hazardous decomposition products: None known. Refer to 'Hazardous combustion products', Section 5.

SECTION 11 — TOXICOLOGICAL INFORMATION

Routes of exposure: Skin contact, eye contact, inhalation, and ingestion.
Toxicological data:
LC_{50} (mg/L/4 hrs) = >4.24*.
LD_{50}, oral, rat (mg/kg) = >5000*
LD_{50}, dermal, rat (mg/kg) = >2000*
*Measured on a similar product.
Carcinogenicity: This product does not contain any materials above reportable levels which are classified as carcinogenic by IARC, ACGIH, OSHA or NTP.
Teratogenicity, mutagenicity, other reproductive effects: This product contains Ethylene glycol. At high doses, which are not maternally toxic, Ethylene glycol may cause teratogenic and embryotoxic effects, based on animal data.
Sensitization to material: None known.
Synergistic materials: Not available.
Conditions aggravated by exposure: Pre-existing eye disorders.

SECTION 12 — ECOLOGICAL INFORMATION

Chemical fate information: The product should not be allowed to enter drains or water courses or be deposited where it can affect ground or surface waters. Do not discharge product unmonitored into the environment. The active ingredient, Glyphosate, is rapidly deactivated by absorption to clay particles. Glyphosate binds strongly to soil. It is not always readily degraded in waste water treatment plants, depending on circumstances like concentration.
Ecotoxicological information: This product is a herbicide and may be toxic to all green plants. The product may be harmful to fish, aquatic invertebrates and aquatic plants. The acute toxicity of the active ingredient, Glyphosate, is measured to be:
Fish - 96-Hr LC_{50}, Rainbow trout *(Salmo gairdneri)* = 95 - 171 mg/L.
Invertebrates - 48-Hr EC_{50}, Daphnids *(Daphnia magna)* = 87 mg/L.
Algae - 96-Hr EC_{50}, Green Algae *(Scenedesmus subspicatus)* = 118 mg/L
Birds:
LD_{50}, Bobwhite quail = >2000 mg/kg
LD_{50}, Mallard duck = >2000 mg/kg.

SECTION 13 — DISPOSAL CONSIDERATIONS

Handling for disposal: Handle waste according to recommendations in Section 7.
Methods of disposal: Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Triple rinse (or equivalent) containers, then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill. Disposal must be in compliance with all Federal, State and local regulations. Contact your local, state or federal environmental agency for specific rules.

SECTION 14 — TRANSPORTATION INFORMATION

US 49 CFR information: Not regulated for transport.
Canadian Transportation of Dangerous Goods Clear Language (CLR) information: Not regulated for transport.

SECTION 15 — REGULATORY INFORMATION

Canada:
WHMIS information: This product is a Pest Control Product and is not regulated as a Controlled Product under the Hazardous Products Act (HPA). However, for reference purposes only, this product would have the following WHMIS Classification if it were regulated as a Controlled Product under the HPA: **Class B3** *(Combustible Liquids)*; **Class D2A** *(Materials causing other toxic effects, Very Toxic Material).*
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and this MSDS contains all the information required by the CPR.
United States:
California Proposition 65 information:
This product contains chemicals known to the state of California to cause cancer. These chemicals include:

Chemical name	CAS Number	% (weight)
p-Dioxane	123-91-1	<0.012
Ethylene oxide	75-21-8	0.00006
Acetaldehyde	75-07-0	0.00006

This product contains a chemical known to the State of California to cause reproductive harm (female). This chemical is:

Chemical name	CAS Number	% (weight)
Ethylene oxide	75-21-8	0.00006

EPA/CERCLA Reportable Quantity (RQ):
5000 lbs (Ethylene glycol, CAS # 107-21-1).
100 lbs (p-Dioxane, CAS # 123-91-1)
10 lbs (Ethylene oxide, CAS # 75-21-8)
1000 lbs. (Acetaldehyde, CAS # 75-07-0)
SARA TITLE III: *Sec. 313, Toxic Chemicals Notification, 40 CFR 372*: This material may be subject to the TSCA notification requirements, since it contains the following Toxic Chemical constituents

Chemical name	CAS Number	% (weight)
Ethylene glycol	107-21-1	0.48
p-Dioxane	123-91-1	<0.012
Ethylene oxide	75-21-8	0.00006
Acetaldehyde	75-07-0	0.00006

SECTION 16 — OTHER INFORMATION

HMIS Rating: *1 Health; 2 Flammability; 0 Reactivity
Legend:
ACGIH - American Conference of Governmental Industrial Hygienists
CAS - Chemical Abstract Service
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR - Code of Federal Regulations
EPA - Environmental Protection Agency
HMIS - Hazardous Materials Identification System
IARC - International Agency for Research on Cancer
Inh - Inhalation
MSHA - Mine Safety and Health Administration
N/Ap - Not Applicable
N/Av - Not Available
NIOSH - National Institute for Occupational Safety and Health
NTP - National Toxicology Program
OEHHA - Office of Environmental Health Hazard Assessment
OSHA - Occupational Safety and Health Act
PEL - Permissible Exposure Limit
PMCC - Pensky Martins Closed Cup
RCRA - Resource Conservation and Recovery Act
SARA - Superfund Amendments & Reauthorization Act
TLV - Threshold Limit Value
TSCA - Toxic Substances Control Act
TWA - Time Weighted Average
WHMIS - Workplace Hazardous Materials Information System
References:
1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2003.
2. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases, 2003 (Chempendium and RTECs).
3. Material Safety Data Sheet from manufacturer.
4. International Agency for Research on Cancer Monographs, Supplement 7, 1988.
5. US EPA Title III List of Lists - October 2001 version.
6. California's OEHHA Proposition 65 List - July 11, 2003 version.
Prepared by: Cheminova Inc.
Telephone #: (973) 305-6600 (8 AM to 5:00 PM EST, Monday to Friday)
Preparation date: August 19, 2003
Revision date: January 16, 2004
Revision reasons:
1. Ingredient concentration range changed, Section 2.
2. Abbreviations updated, Section 16.

VID 9.2.04