



For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident,  
Call CHEMTREC Day or Night: 1-800-424-9300.  
For Medical Emergencies Only, Call 1-877-325-1840.

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** REMUDA™ PLUS  
**Synonyms:** Herbicide Mixture of Glyphosate and Diquat Dibromide  
**EPA Reg. No.:** 228-516-54705

**Company Name:** Lawn and Garden Products, Inc.  
P.O. Box 35000  
Fresno, CA 93745-5000

**Date of Issue:** March 27, 2007      **Supersedes:** New  
**Sections Revised:** New

### 2. HAZARDS IDENTIFICATION

**Emergency Overview:**

**Appearance and Odor:** Dark brown liquid with a slight odor.

**Warning Statements:** Keep out of reach of children. CAUTION. Harmful if swallowed or inhaled. Causes moderate eye irritation. Avoid breathing dust or spray mist. Avoid contact with eyes, skin or clothing.

**Potential Health Effects:**

**Likely Routes of Exposure:** Inhalation, eye and skin contact.

**Eye Contact:** Moderately irritating based on toxicity studies. May cause pain, redness and tearing.

**Skin Contact:** Minimally toxic and moderately irritating based on toxicity studies.

**Ingestion:** Slightly toxic based on toxicity studies.

**Inhalation:** Slightly toxic if inhaled based on toxicity studies.

**Medical Conditions Aggravated by Exposure:** Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

See Section 11: TOXICOLOGICAL INFORMATION for more information.

**Potential Environmental Effects:**

This product is toxic to aquatic invertebrates.

See Section 12: ECOLOGICAL INFORMATION for more information.

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS NO.	% BY WEIGHT
Glyphosate, N-(phosphonomethyl) glycine, in the form of its isopropylamine salt	38641-94-0	18.00
Diquat dibromide	85-00-7	0.73
Other Ingredients		81.27

**4. FIRST AID MEASURES**

**If Swallowed:** Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

**If Inhaled:** Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

**If in Eyes:** Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

**If on Skin:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 to 20 minutes. Call a poison control center or doctor for treatment advice.

**5. FIRE FIGHTING MEASURES**

**Flash Point:** Not applicable due to aqueous formulation

**Autoignition Temperature:** Not determined

**Flammability Limits:** Not determined

**Extinguishing Media:** Recommended for large fires: foam or water spray. Recommended for small fires: dry chemical or carbon dioxide.

**Special Fire Fighting Procedures:** Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full fire-fighting turn out gear. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later.

**Unusual Fire and Explosion Hazards:** If water is used to fight fire, contain runoff, using dikes to prevent contamination of water supplies. Dispose of fire control water later. This product reacts with galvanized steel or unlined steel (except stainless steel) to produce hydrogen gas that may form a highly combustible gas mixture which could flash or explode.

**Hazardous Decomposition Materials (Under Fire Conditions):** May produce gases such as oxides of nitrogen, carbon and phosphorous and fumes of bromide.

**National Fire Protection Association (NFPA) Hazard Rating:**

**Rating for this product: Health: 1 Flammability: 1 Reactivity: 0**

Hazards Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

**6. ACCIDENTAL RELEASE MEASURES**

**Personal Precautions:** Wear appropriate protective gear for the situation. See Personal Protection information in Section 8.

**Environmental Precautions:** Prevent material from entering public sewer systems or any waterways. Do not flush to drain. Large spills to soil or similar surfaces may necessitate removal of topsoil. The affected area should be removed and placed in an appropriate container for disposal.

**Methods for Containment:** Dike spill using absorbent or impervious materials such as earth, sand or clay. Collect and contain contaminated absorbent and dike material for disposal.

**Methods for Cleanup and Disposal:** Pump any free liquid into an appropriate closed container. Collect washings for disposal. Decontaminate tools and equipment following cleanup. See Section 13: DISPOSAL CONSIDERATIONS for more information.

**Other Information:** Large spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies.

## 7. HANDLING AND STORAGE

**Handling:**

Avoid breathing dust or spray mist. Avoid contact with eyes, skin or clothing. Users should 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. Clothing or protective equipment exposed to this product should be washed in detergent and hot water. Such items should be kept and washed separately from other laundry. Do not allow people or pets to touch treated plants until sprays have dried.

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. 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 cigarette or other ignition source.

**Storage:**

Store in original container in a safe place away from direct sunlight. Do not contaminate water, food or feed by storage or disposal.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Engineering Controls:**

Where engineering controls are indicated by specific use conditions or a potential for excessive exposure, use local exhaust ventilation at the point of generation.

**Personal Protective Equipment:**

**Eye/Face Protection:** Not normally required. To avoid contact with eyes, wear chemical goggles or shielded safety glasses. An emergency eyewash or water supply should be readily accessible to the work area.

**Skin Protection:** Not normally required. To avoid contact with skin, wear long pants, long-sleeved shirt, socks and shoes. An emergency shower or water supply should be readily accessible to the work area.

**Respiratory Protection:** Not normally required. If vapors or mists exceed acceptable levels, wear NIOSH approved air-purifying respirator with cartridges/canisters approved for use against pesticides.

**General Hygiene Considerations:** Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material: 1) do not store, use and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored; 2) wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics or using the toilet.

**Exposure Guidelines:**

Component	OSHA		ACGIH		Unit
	TWA	STEL	TWA	STEL	
Isopropylamine Salt of Glyphosate	NE	NE	NE	NE	
Diquat dibromide	NE	NE	0.5 (I) (Skin) 0.1(R) (Skin)	NE	mg/m <sup>3</sup>

I = Inhalable Fraction  
R = Respirable Fraction

NE = Not Established

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance and Odor:** Dark brown liquid with a slight odor..

<b>Boiling Point:</b>	Not determined	<b>Solubility in Water:</b>	Miscible
<b>Density:</b>	8.97 pounds/gallon	<b>Specific Gravity:</b>	1.077 @ 20°C
<b>Evaporation Rate:</b>	Not determined	<b>Vapor Density:</b>	Not determined
<b>Freezing Point:</b>	Not determined	<b>Vapor Pressure:</b>	Not determined
<b>pH:</b>	4.88 (1% solution)	<b>Viscosity:</b>	2.793 cSt @ 20°C

**Note:** Physical data are typical values, but may vary from sample to sample. A typical value should not be construed as a guaranteed analysis or as a specification.

**10. STABILITY AND REACTIVITY**

**Chemical Stability:** This material is stable under normal handling and storage conditions.

**Conditions to Avoid:** Excessive heat. Do not store near heat or flame.

**Incompatible Materials:** Strong oxidizing agents: bases and acids. This product reacts with galvanized steel or unlined steel (except stainless steel) to produce hydrogen gas that may form a highly combustible gas mixture which could flash or explode.

**Hazardous Decomposition Products:** Under fire conditions, may produce gases such as oxides of nitrogen, carbon and phosphorous and fumes of bromide.

**Hazardous Reactions:** Hazardous polymerization will not occur.

**11. TOXICOLOGICAL INFORMATION****Toxicological Data:**

Data from laboratory studies conducted on a similar, but not identical, formulation:

**Oral:** Rat LD<sub>50</sub>: >5,000 mg/kg (female)

**Dermal:** Rat LD<sub>50</sub>: >5,000 mg/kg

**Inhalation:** Rat 4-hour LC<sub>50</sub>: >2.03 mg/l

**Eye Irritation:** Rabbit: Moderately irritating

**Skin Irritation:** Rabbit: Moderately irritating

**Skin Sensitization:** Not a contact sensitizer in guinea pigs following repeated skin exposure.

**Subchronic (Target Organ) Effects:** Repeated overexposure to glyphosate may decrease body weight gains and effects to liver. Repeated overexposure to diquat dibromide may cause effects to skin, lungs, liver and kidneys.

**Carcinogenicity / Chronic Health Effects:** Prolonged overexposure to glyphosate may cause effects to the liver. Prolonged overexposure to diquat dibromide may cause effects to eyes (cataracts) and kidneys. There was no evidence of carcinogenicity in animal studies using glyphosate or diquat dibromide. EPA has given glyphosate and diquat dibromide a Group E classification (evidence of non-carcinogenicity in humans).

**Reproductive Toxicity:** In laboratory animal studies with glyphosate, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Animal tests with diquat dibromide have not demonstrated reproductive effects.

**Developmental Toxicity:** In animal studies, glyphosate did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects to the mother. Animal studies on diquat dibromide resulted in decreased fetal body weight, kidney and skeletal effects at doses that were also toxic to mother animals.

**Genotoxicity:** Glyphosate has produced no genetic changes in a variety of standard tests using animals and animal or bacterial cells. No evidence of mutagenicity in *in vivo* assays using diquat dibromide.

**Assessment Carcinogenicity:** None listed with ACGIH, IARC, NTP or OSHA.

See Section 2: HAZARDS IDENTIFICATION for more information.

## 12. ECOLOGICAL INFORMATION

### **Ecotoxicity:**

Data on Glyphosate technical:

96-hour LC <sub>50</sub> Bluegill:	120 mg/l	Bobwhite Quail 8-day Dietary LC <sub>50</sub> :	>4,500 ppm
96-hour LC <sub>50</sub> Rainbow Trout:	86 mg/l	Mallard Duck 8-day Dietary LC <sub>50</sub> :	>4,500 ppm
48-hour LC <sub>50</sub> Daphnia:	780 mg/l		

Data on Diquat dibromide:

Aquatic LC <sub>50</sub> Bluegill:	13.9 ppm	Bobwhite Quail 8-day Dietary LC <sub>50</sub> :	106 ppm
Aquatic LC <sub>50</sub> Rainbow Trout:	14.8 ppm	Mallard Duck 8-day Dietary LC <sub>50</sub> :	980 ppm
Aquatic EC <sub>50</sub> Daphnia:	0.77-1.19 ppm	Bees LC <sub>50</sub> :	47-100 µg/bee

### **Environmental Fate:**

In the environment, salts of glyphosate rapidly dissociate to glyphosate, which adsorbs strongly to soil and is expected to be immobile in soil. Glyphosate is readily degraded by soil microbes to AMPA (aminomethyl phosphonic acid) that is further degraded to carbon dioxide. Glyphosate and AMPA are unlikely to enter ground water due to their strong adsorptive characteristics. Terrestrially-applied glyphosate has the potential to move into surface waters through soil erosion because it may be adsorbed to soil particles suspended in the runoff. Aquatic applications registered for certain formulations may also result in glyphosate entering surface waters. Complete degradation is slow, but dissipation in water is rapid because glyphosate is bound in sediments and has low biological availability to aquatic organisms. These characteristics suggest a low potential for bioconcentration in aquatic organisms and this has been verified by laboratory investigations of glyphosate bioconcentration in numerous marine and freshwater organisms with and without soil. The maximum whole body bioconcentration factors for fish were observed to be less than 1X. Bioconcentration factors for sediment dwelling mollusks and crayfish tended to be slightly higher, but were always less than 10X. In addition, any residues accumulated in organisms were rapidly eliminated.

Diquat dibromide's primary route of environmental dissipation is strong adsorption to soil particles, aquatic sediments or suspended particulates, which typically have a large excess of binding capacity. The strong chemical bonds formed by diquat absorption to soil particles make the herbicide biologically unavailable to terrestrial or aquatic organisms. Diquat does not hydrolyse or photodegrade and is resistant to microbial degradation under aerobic and anaerobic conditions.

## 13. DISPOSAL CONSIDERATIONS

**If empty** – Do not reuse this container. Place in trash or offer for recycling if available. **If partly filled** – Call your local solid waste agency for disposal instructions. Never place unused product down any indoor or outdoor drain.

## 14. TRANSPORTATION INFORMATION

Follow the precautions indicated in Section 7: HANDLING AND STORAGE of this MSDS.

D.O.T.:	Not D.O.T. Regulated
Other Shipping Information:	Compounds, Tree or Weed Killing (Herbicide), Liquid. NMFC Item 50320, LTL Class 60

**15. REGULATORY INFORMATION****U.S. Federal Regulations:**

**TSCA Inventory:** This product is exempted from TSCA because it is solely for FIFRA regulated use.

**SARA Hazard Notification/Reporting:****Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370):**

Immediate, Delayed

**Section 313 Toxic Chemical(s):**

None

**Reportable Quantity (RQ) under U.S. CERCLA:**

Diquat (CAS No. 85-00-7) 1,000 pounds

**RCRA Waste Code:**

None

**State Information:**

Other state regulations may apply. Check individual state requirements.

**California Proposition 65:** None Listed

**16. OTHER INFORMATION**

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-ACCEPTED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course.

Use, storage and disposal of pesticide products are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling, and all necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of Federal law to use a pesticide product in any manner not prescribed on the EPA-accepted label.

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