Tenkoz Inc.

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: Buccaneer 5 Glyphosate Herbicide
Synonyms: Isopropylamine Salt of Glyphosate; Glyphosate IPA Salt
EPA Reg. No.: 71368-43-55467

Company Name: Tenkoz, Inc.
100 North Point Center East
Alpharetta, GA 30022

Date of Issue: December 13, 2006 **Supersedes:** July 13, 2004
Sections Revised: All - new ANSI format

2. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance and Odor: Clear, viscous amber colored solution with slight amine odor.
Warning Statements: Keep out or reach of children. WARNING. Causes substantial but temporary eye injury. Harmful if absorbed through the skin. Do not get in eyes or on clothing. Avoid contact with skin, eyes or clothing. Harmful if inhaled. Avoid breathing spray mist.

Potential Health Effects:
Likely Routes of Exposure: Inhalation, eye and skin contact.
Eye Contact: Causes substantial but temporary eye injury.
Skin Contact: This product is no more than slightly toxic and no more than slightly irritating based on toxicity studies.
Ingestion: This product 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.
Inhalation: This product is no more than moderately toxic if inhaled based on toxicity studies. **Medical Conditions Aggravated by Exposure:** None known

See Section 11: TOXICOLOGICAL INFORMATION for more information

Potential Environmental Effects:
Available data on similar formulations suggest that this product would be slightly to moderately toxic to aquatic organisms and practically non-toxic to avian species, honeybees and earthworms.

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	50.6
Other Ingredients Including:		49.4
Ethoxylated Tallowamines	61 791-26-2	

4. FIRST AID MEASURES

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
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 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.

5. FIRE FIGHTING MEASURES

Flash Point: >210°F
Autoignition Temperature: Not determined **Flammability Limits:** Not determined

Extinguishing Media: In case of fire, use water (flood with water), dry chemical, CO_2, or alcohol foam.
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: Containers will burst from internal pressure under extreme fire conditions. If water is used to fight fire or cool containers, dike to prevent runoff contamination of municipal sewers and waterways.
Hazardous Decomposition Materials (Under Fire Conditions): Under fire conditions, may produce gases such as nitrogen oxides, carbon oxides and phosphorous oxides.

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. ACCIDENTIAL 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 Clean-Up and Disposal: Thoroughly scrub floor or other impervious surface with a strong industrial detergent and rinse with water. 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:
Do not get in eyes or on clothing. Avoid contact with skin, eyes or clothing. 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.

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:
Do not contaminate water, foodstuff, feed or seed by storage or disposal. STORE ABOVE 10°F (-12°C) TO KEEP PRODUCT FROM CRYSTALLIZING. Crystals will settle to the bottom. If allowed to crystallize, place in a warm room 68°F (20°C) for several days to redissolve and shake, roll or agitate to mix well before using.

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.

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], then handler PPE requirements may be reduced or modified as specified in the WPS.

Personal Protective Equipment:
Eye/Face Protection: To avoid contact with eyes, wear chemical goggles, face shield or shielded safety glasses. An emergency eyewash should be readily accessible to the work area.
Skin Protection: To avoid contact with skin, wear long pants, long-sleeved shirt, chemical-resistant gloves made of any waterproof material such as polyethylene or polyvinylchloride, socks and shoes. An emergency shower 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:

	OSHA		ACGIH		
Component	TWA	STEL	TWA	STEL	Unit
Isopropylamine Salt of Glyphosate	NE	NE	NE	NE	
Ethoxylated Tallowamines	NE	NE	NE	NE	

NE = Not Established

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Clear, viscous amber colored solution with slight amine odor.

Boiling Point:	Not determined	**Solubility in Water:**	Soluble
Density:	1.20 g/cc @ 25°C	**Specific Gravity:**	1.200 g/cc @ 25°C
Evaporation Rate:	Not determined	**Vapor Density:**	Not determined
Freezing Point:	10°F (-12°C)	**Vapor Pressure:**	Not determined
pH:	4.72 (1% solution)	**Viscosity:**	156 cps @ 25°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 nitrogen oxides, carbon oxides and phosphorous oxides.
Hazardous Reactions: Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Toxicological Data:
Data from laboratory studies conducted on this product are summarized below:

Oral: Rat $_{LD50:}$ >5,000 mg/kg; FIFRA Category IV
Dermal: Rat $_{LD50:}$ >2,000 mg/kg; FIFRA Category III
Inhalation: Rat 4-hr $_{LC50:}$ >0.57 mg/l and <2.09 mg/L; FIFRA Category III
Eye Irritation: Rabbits (3): Corneal opacity and conjunctivitis were noted in all eyes at the one hour observation. Iritis was noted in one eye from 48 through day 4. The conjunctivitis resolved by day 7 and the corneal opacity resolved by day 10 when all eyes were free of irritation; FIFRA Category II **Skin Irritation:** Rabbits (3); Very slight erythema was noted at all sites one hour after patch removal and well defined erythema at all sites 24 hours after patch removal. One site was free of dermal irritation at 48 hours and two sites were free at 72 hours; FIFRA Category IV
Skin Sensitization: Not a contact sensitizer in guinea pigs following repeated skin exposure.

Toxicity of Isopropylamine Salt of Glyphosate:
In repeat dosing studies (6 month), dogs fed a more concentrated form of this product exhibited slight body weight changes. Following repeated skin exposure (3 weeks) to this product, skin irritation was the primary effect in rabbits. No skin allergy was observed in guinea pigs following repeated skin exposure.

Additional toxicity information is available on glyphosate, the active herbicidal ingredient of this product. Following repeated exposures (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). 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.

Toxicity of Ethoxylated Tallowamine:
The surfactant component of this product is reported to cause irritation to the eyes and skin and may contribute to the irritation potential reported for this herbicide. Ingestion may product gastrointestinal irritation, nausea, vomiting and diarrhea.

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

See Section 2: HAZARDOUS IDENTIFICATION for more information.

12. ECOLOGICAL INFORMATION

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.

Available data on similar formulations suggest that this product would be slightly to moderately toxic to aquatic organisms and practically non-toxic to avian species, honey bees and earthworms.

Ecotoxicity:

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

Rainbow Trout 96-hr $_{LC50:}$	22 mg/L (static)	Fathead minnow 96-hr $_{LC50:}$	9.4 mg/L
Rainbow Trout 96-hr $_{LC50:}$	8.2 mg/L (dynamic)	Channel Catfish 96-hr $_{LC50:}$	16 mg/L
Daphnia Magna 48-hr $_{LC50:}$	37 mg/L (aeration)	Chinook Salmon 96-hr $_{LC50:}$	20 mg/L
Daphnia Magna 48-hr $_{LC50:}$	24 mg/L (without aeration)	Coho Salmon 96-hr $_{LC50:}$	22 mg/L
Bluegill Sunfish 96-hr $_{LC50:}$	5.8 mg/L (dynamic)	Bobwhite Quail 8-day $_{LC50:}$	>6,300 ppm
Bluegill Sunfish 96-hr $_{LC50:}$	14 mg/L (static)	Mallard Duck 8-day $_{LC50:}$	>6,300 ppm
Gammarus pseudolimnaeus 48-hr $_{EC50:}$	42 mg/L	Algae S. Capricornutum 72-hr $_{EC50:}$	2.1 mg/L

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 organism were rapidly eliminated.

13. DISPOSAL CONSIDERATIONS

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

Waste Disposal Method:

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 label safeguards until container is destroyed.

Container Handling and Disposal:

Plastic Bottles and Non-Returnable Plastic Drums: 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.

Returnable/Refillable Containers: After use, return the container to the point of purchase or designated locations. The container must only be refilled with this product. DO NOT REUSE THE CONTAINER FOR ANY OTHER PURPOSE. Prior to refilling, inspect thoroughly for damage such as cracks, punctures, abrasions and damaged or worn out threads on closure devices. Do not refill or transport damaged or leaking containers. Check for leaks after refilling and before transportation. If the container is not being refilled, return it to the point of purchase.

14. TRANSPORATION INFORMATION

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

For Department of Transportation (DOT) regulatory information, if required, consult transportation regulations, product-shipping papers or call Tenkoz at 770-343-8509, Monday through Friday, 8:00 AM to 5:00 PM Eastern Time.

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
Section 313 Toxic Chemical(s): None

Reportable Quantity (RQ) under U.S. CERCLA: None

RCRA Waste Code: None

State Information:
Other state regulations may apply. Check individual state requirements.
California Proposition 65: Not 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.

Although the information and recommendations set forth herein (hereinafter “Information”) are presented in good faith and believed to be correct as of the date hereof, Tenkoz, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Tenkoz, Inc. be responsible for damages of any nature whatsoever resulting from the use or of reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Buccaneer is a trademark used under license.