

STATE OF MICHIGAN



MDNR Early Detection and Response Program

Environmental Assessment of treatment
methods for controlling aquatic invasive
species

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A summary of potential impacts of response and control options associated with treatment of high priority aquatic invasive species across the state of Michigan through the MDNR Wildlife Division Early Detection and Response Program.

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I. Authority and Purpose

The purpose of this document is to evaluate and summarize potential environmental impacts of proposed management activities in conjunction with the Michigan Department of Natural Resources (DNR) Wildlife Division Early Detection and Response Program.

In 2010, the DNR and Michigan Natural Features Inventory (MNFI) were granted \$1,028,548.00 from the Environmental Protection Agency to develop and implement an Early Detection and Response (EDR) program with the goal of detecting and eradicating high-threat aquatic invasive species in the state of Michigan. In 2013, additional funding was awarded through the US Fish and Wildlife Service for continued administration of the EDR program. Overall, the project aims to use the best known methods to detect, eradicate and control several high-priority aquatic invasive species that impact the health of the Great Lakes.

This grant project supports the Great Lakes Restoration Initiative and the Great Lakes Water Quality Agreement, pursuant to Public Law 111-88 and will help direct future resources for invasive species control to the most cost-effective, strategic and highest threat locations.

II. General Plant Information

A. European frog-bit (*Hydrocharis morsus-ranae*)

Description: European frog-bit (EFB) is a free-floating, semi-emergent aquatic plant native to Europe, Asia and parts of Africa. European frog-bit is commonly found in slow moving waters including rivers, streams, ditches and inland ponds. The mode of transportation is unclear, however most likely occurs through overland transport and the manipulation of water levels from the Great Lakes to inland water bodies.

Identification and Reproduction: EFB is similar in appearance to water lilies, with quarter-sized, oval or heart-shaped leaves. The leaves are free-floating with several expansive roots attached and may rest near the water surface or emerge slightly above. EFB is free floating, and often grows in high densities. The roots of leaves become tangled underwater and form dense mats of vegetation. EFB is dioecious, with male and female parts located on different plants. Female EFB flowers are small, three-petaled and white with a bright yellow center. The main mode of reproduction is through vegetative means, as EFB is not known to produce seed. The roots produce stolons and buds called turions that fall off during winter and remain in dormancy until the following spring when they begin to grow. One plant can produce up to 100 turions.

Distribution and Range: The plant was introduced to Canada in the early 1930's for experimental farming as an ornamental species. By the mid 1980's EFB was confirmed throughout Southern Ontario and has since spread throughout the great Lakes basin to New York, Vermont, Washington and Michigan. In Michigan, EFB has been confirmed in locations throughout the Lower Peninsula and in isolated locations of the Upper Peninsula. The largest and most recent infestations include

the northern-most confirmed location, Thunder Bay in Alpena County, and in Chippewa County. There are additional sites located throughout the Saginaw Bay region and Southeast Michigan.

Impacts: EFB spreads rapidly in aquatic environments, including sensitive inland and coastal wetland areas that provide critical habitat for waterfowl and rare bird species. The formation of thick vegetative mats fills the water column and limits light availability for submerged native plant species. These mats can inhibit movement of waterfowl, fish and boats as well as limit recreational opportunities such as fishing and swimming. Additionally, as large colonies die, oxidation of detritus reduces overall dissolved oxygen which can have negative impacts on fish and other aquatic species.

B. European water-clover (*Marsilea quadrifolia* L.)

Description: European water-clover (EWC) is a rooted, aquatic fern native to Europe. Commonly found in slow-moving waters including ditches, rivers and lakes. The plant is likely spread through overland transport and intentional or unintentional dumping.

Identification and Reproduction: EWC are four-petaled semi-emergent plants with leaves resembling 4-leaf clovers. The leaves are attached to long, rooted stolons. The leaves may float on or near the water surface or may emerge above the surface. EWC produces no flowers or seeds, rather reproduces rhizomally by sprouting new growth from the sprawling rhizome or through nodules called sporocarps that are dispersed by waterfowl and aquatic species (Johnson 1986).

Distribution and Range: The plant was first observed in Connecticut in 1860. The plant has since spread to 22 states, likely via the plant and aquarium trade. Numerous populations have established throughout the Northeastern United States, with isolated observations occurring as far west as Kansas. In Michigan, isolated occurrences have been confirmed in Southeast Michigan.

Impacts: EWC spreads rapidly, forming dense mats that limit light availability allowing EWC to outcompete native aquatic species. The sporocarps of EWC can be transported over long distances far away from source populations, promoting substantial dispersal and infestation potential. Additionally, EWC is still commercially available as an aquarium and water garden species which provides a significant pathway for continued and future invasions of native ecosystems.

C. Flowering rush (*Butomus umbellatus*)

Description: Flowering rush (FR) is an emergent aquatic species native to Europe and Asia. FR inhabits shorelines, drainage ditches and shallow wetlands, though can invade water bodies up to 20ft. deep. The spread of FR has been linked to manipulation of water levels which expose bare ground and facilitate sprouting.

Identification and Reproduction: FR is a sedge with emergent triangular stems up to 4.5 ft. Some populations produce clusters of 3 petaled white or pink flowers at the terminus of the stem in an umbrella like formation. Each flower is capable of producing up to 200 seeds, which is one of three modes of reproduction. FR also reproduces via bulblets on the stems and roots as well as through

sprouting of rhizomal fragments. FR forms incredibly dense stands in disturbed areas or areas where the water level has recently dropped. The ability to sprout from rhizome fragments promotes rapid spread.

Distribution and Range: The first confirmation of FR in North America occurred in 1897 in the St. Lawrence River. From there, the plant spread through Canada and the Northern United States, reaching Michigan in 1918. FR is currently widespread across the region and has been confirmed at over 200 locations in Michigan's Lower Peninsula.

Impacts: Although FR typically does not produce viable seed, the rhizomal spread of the species is incredibly effective. Inland and coastal wetlands are extremely vulnerable to invasion, particularly in areas where water levels are manipulated. FR forms dense, monotypic stands that dominate the invaded system, virtually extinguishing populations of native species. FR typically invades area where vegetation was previously absent, altering fish and other aquatic communities as well as eliminating open water environments important for waterfowl and recreational use. FR is currently listed as a restricted species in Michigan due to the associated impacts to critical wildlife habitat and the potential for further spread.

D. Parrot feather (*Myriophyllum aquaticum*)

Description: Parrot feather (PF) is an emergent aquatic plant that invades lakes, ponds and streams, tolerant of fluctuations in water levels and sites with high levels of nutrients. PF is native to South America and was imported to the United States for use as an aquarium and water garden plant. The predominant method of spread is through overland transport via boats and recreational equipment.

Identification and Reproduction: The leaves of PF are whorled around a stout stem and look much like a feather when viewed closely. This often results in PF being mistaken for other aquatic plants such as Eurasian watermilfoil. Stems can reach 5 ft. in length with the entire plant reaching up to 16 ft. in length and leaves emerging up to 1 foot above the water's surface. Plants form in dense mats, especially in shallow waters. PF does flower and produce fruits, however these structures remain submerged. PF reproduction is primarily vegetative and occurs when plant fragments disperse and establish new growth.

Distribution and Range: PF was introduced in the 1890's as an aquarium and water garden plant. The species has since spread to 26 states. PF has only recently been confirmed in isolated locations in Michigan in Brownstown Township. Though these incidences appear to be isolated, there is a strong possibility that PF could spread into Michigan waters of Lake Erie. The species is currently listed as Prohibited in Michigan and many other states, meaning it may not be transported or sold within state boundaries.

Impacts: PF poses significant risk to both inland and great lake systems. The dense mats of vegetation and deep root systems fill the water column and limit light availability. Low light conditions limit algae and native plant growth which significantly impact the aquatic food web. In lakes and streams, this may impact populations of sport fish in the Great Lakes region. These mats

of vegetation also provide habitat for mosquitoes which can contribute to the spread of blood-borne diseases such as West Nile Virus. The thick stems of PF can limit recreational activities and in areas with PF infestation, boating and other aquatic recreation may promote further spread.

E. Water hyacinth (*Eichhornia crassipes*)

Description: Water hyacinth (WH) is a free-floating aquatic plant which produces attractive purple flowers, which have promoted its distribution as a water garden plant. WH is native to South America and was imported for sale in the aquarium trade, the likely means by which the plant has spread. WH is commonly found in marshes, swamps, ditches, lakes and rivers.

Identification and Reproduction: WH forms dense vegetative mats covering large expanses of open water with green, waxy, cup-like leaves. The leaves have a distinctive air bladder that allows them to float. Stems may grow to nearly 2 ft. and produce clusters of 8-15 flowers. Violet or purple flowers bloom in mid-summer and are similar in appearance to terrestrial irises. The primary means of reproduction is through fragmentation of stolons which create new growth. WH does produce seed; however it is unclear as to whether seeds overwinter in Northern latitudes.

Distribution and Range: WH is currently still commercially available throughout much of the country including Michigan, despite having been regulated in 7 states. As with many aquatic invasive plants, WH was introduced to the United States and has since spread to nearly 30 states. The plant has been confirmed in several locations across southern Michigan.

Impacts: Due to its ability to nearly double population size in only 2 weeks, WH has been deemed one of the most problematic plants in the world. Covering massive expanses of open water with its leaves, water hyacinth shades out native plants and aquatic vegetation, reducing important structures for fish and native wildlife (Toft et. al 2003). Wetland habitat is declining across Michigan for a number of reasons, and the invasion of water hyacinth is contributing to further decline. The environments in which WH grows are critical for conservation of waterfowl and other wetland associates, as well as important centers of recreational opportunities which are also negatively impacted by the plant.

F. Water Lettuce (*Pistia stratiotes*)

Description: Water lettuce (WL) is a free-floating aquatic plant that forms dense populations of rosettes that resemble small heads of lettuce. The plant commonly invades drainage ditches, lakes and ponds. The origin of WL is uncertain, but it is believed to be native to South America or Africa and it is assumed to have spread via repeated introductions. WL is widely used as an aquarium plant, further facilitating spread.

Identification and Reproduction: WL produces lettuce-like rosettes with parallel veins that are dull green in color. The rosettes have no stem; rather they float on the water surface with clumps of feathery roots below. WL produces small flowers, typically hidden within the rosette, that give way to small green fruits. The rosettes form in large, dense clumps that float freely facilitating

movement of the plant within connected water bodies. WL reproduces via daughter plants so rapidly that within a single growing season infestations can disrupt waterways (Haynes 1988). Most infestations are linked to improper disposal of aquarium specimens or introduction via boats or trailers.

Distribution and Range: The first observation of WL was recorded in Florida in the mid 1700's. WL is currently widespread in coastal regions of many US states and has been confirmed in 5 Midwestern states, including Michigan. The continued distribution of WL as an ornamental plant further complicates the issues of control and prevention of future invasions.

Impacts: Impacts posed by WL include reduction of dissolved oxygen levels, disrupting natural fish and aquatic plant communities; displacement of native plants via competition; and impairing the use of waterways for drainage or recreation. Additionally, WL infestations have been shown to facilitate growth in insect populations including mosquitoes (Lounibos and Escher 1985). As with many of the species described in this document, the habitats at risk are already in decline due to a number of stressors and these habitats play an important role in the survival of rare and important species.

G. Additional Plants of Concern

The DNR recognizes four additional aquatic invasive species of concern that pose threat to the integrity of Michigan's natural resources. Water chestnut (*Trapa natans* L.), water soldier (*Stratiotes aloides*), Brazilian water-weed (*Egeria densa*) and hydrilla (*Hydrilla verticillata*) have not yet been detected in Michigan, however due to the potential impacts each of these species could have on aquatic ecosystems, any reported occurrences will be responded to. EDR program staff will verify reports of these species and assess potential response options. Response options will likely not fall outside of the methods described throughout the remainder of this document.

III. Preferred Alternatives

A. Area of Control

The Michigan Department of Natural Resources (DNR) has implemented an Early Detection and Response program to survey and treat infestations of the species listed above on a statewide level in coordination with federal (U.S. Fish and Wildlife Service) and local (Cooperative Invasive Species Management Areas (CISMA)) partners. Given the potential impact of these species to Michigan's natural resources, the Michigan DNR proposes expansion of current efforts to improve efficiency and efficacy in control of these species.

Response efforts have occurred in four main areas of the state based on reported occurrences: Southeast Michigan, Saginaw Bay, the Thunder Bay watershed in Alpena County, and Munuscong Bay in Chippewa County. Through cooperative efforts, the EDR program has verified 128 reports and responded to 63 infestations of 6 priority species across the state.

Continued efforts will be primarily directed by the Michigan DNR in coordination with local CISMAs to respond to all reports of the priority species and conduct response efforts at verified sites across the state.

B. Treatment Methods

For many of the species targeted through this program, herbicide is the most successful method of control. While for some infestations and some species, mechanical treatments may be an effective means of control, many situations will require the use of herbicides. Mechanical treatments can be successful in certain situations, however are rarely an effective stand-alone method. Treatment options will be assessed on a site-by-site basis, accounting for size of infestation, potential non-target impacts and likelihood for success. Our preferred method will involve a combination of herbicide and mechanical treatments to achieve greatest efficacy and minimize impact to non-target species.

Water lettuce (WL) and water hyacinth (WH) have primarily been found in small populations and have been successfully treated through hand removals. However, exceptions exist and control options have often been tailored to site conditions. Research has shown that herbicides prove a successful means of control for these species when hand removals are impractical. Research on the control of these species has shown herbicides with the active ingredient diquat to be most effective (University of Florida). Where site conditions prohibit hand harvesting, herbicide treatments will be applied through handheld or backpack sprayers at rates consistent with EPA regulations.

European water-clover (EWC) has been verified in two watersheds to date and is being closely monitored through follow-up surveys of infested and adjacent water bodies. If infestations warrant response, these locations may be treated with herbicide to minimize spread. The primary treatment for verified infestations of EWC will be hand removal of all visible vegetation.

European frog-bit (EFB) has been treated using a combination of hand removals and herbicide treatments, as conditions dictate. Hand removals have been applied to small infestations or infestations that are located around high traffic boat launches where the threat of spread is high, providing the most practical means of control while limiting further spread. Hand removals are not an effective option on large-scale infestations due to the amount of man-hours it requires and the risk of spreading frog-bit through fragmentation. Diquat, triclopyr, and imazapyr have been shown to provide effective levels of control and will be the primary treatment methods for larger-scale infestations of EFB.

Herbicide treatments have been the primary method of control for flowering rush (FR) due to the scale of infestation at treatment sites and the risk of promoting spread through mechanical removal. Many of the sites identified for treatment of FR have been large-scale infestations where chemical control is the most practical and effective option available. Mechanical treatment options require disturbance of sediments, which has been linked to increased spread and re-vegetation of FR. Some mechanical methods, such as removing flower heads, may prove beneficial in areas where

treatments cannot be done or in high traffic areas to help reduce public collection of FR stems for ornamental use. Flowering rush is a perennial plant that produces viable seeds so this form of treatment can help to limit the spread when other treatment options are not possible. It is important that treatments are done prior to seed development. The herbicides currently being used include glyphosate, imazapyr, diquat and triclopyr, based on the level of control resulting from prior treatments with these herbicides.

Currently, there is one verified parrot feather (PF) site in the state of Michigan. This site has been treated with herbicide for the past two years through contracted services in compliance with all EPA regulations. Like EFB and EWC, this plant spreads by fragmentation and hand removals may facilitate the spread. The preferred herbicides for parrot feather control are triclopyr and fluridone. Triclopyr has shown to be very effective in treating parrot feather and fluridone in granular form can be used in isolated sites without flowing water.

For all species, post-treatment monitoring and follow up treatments both within the field season and from one field season to the next will be conducted to evaluate efficacy. All herbicide and manual removals will be monitored to assess effectiveness of treatments and to inform future control actions. Monitoring may also provide valuable data for development of best control practices of these priority invasive species for use by partners and other agency staff.

IV. Alternative Actions

A. Biological control

Research on bio-control options for parrot feather, European frog-bit and flowering rush are ongoing, but no known biological agents are available at this time.

The introduction of insects as bio-control agents for water lettuce and water hyacinth has occurred in some states with a moderate degree of success. With all of these efforts, insects were found to reduce plant vigor but were unsuccessful at completely controlling infestations. Where these methods are employed, herbicide applications are required to achieve desired levels of control. (UF-IFAS)

With all of these species, though some bio-control agents may become available, there is a certain level of risk that accompanies use of this method. Additional consideration of the costs of both research and introduction of bio control agents render this method highly impractical at the scale of work being conducted.

B. Mechanical harvesting

Physical removal is a viable option for some smaller infestations and is a method that will be employed where appropriate. However, where infestations are dense or covering a large area, mechanical removal by hand pulling or digging is only moderately effective at reducing the overall

population. This method is time-consuming, labor-intensive and requires a means of proper disposal, which may be prohibitive. Given this information, physical removal should be applied on a scale that will result in successful reductions of the population.

Mechanical removal of large infestations would require specialized amphibious equipment that is cost-prohibitive. Additionally, large-scale mechanical removal may create unnecessary and undesirable disturbance to sensitive or high-value sites. Due to the nature of spread in many of these species, disturbance may actually increase populations of invasive aquatic plants by removing native and desirable species and providing openings for invasive plants to colonize. Some of the target species reproduce through rhizomes or stolons, which through mechanical removal may be unintentionally spread in the treatment area and to other sites if equipment is not decontaminated properly. For this reason, mechanical removal should not be a stand-alone option and will typically be applied in conjunction with herbicide treatment.

C. Hydrologic manipulation

For many of the target species, it is not well understood how water level manipulation will effect survival or re-emergence post-treatment. Seed viability and reproductive potential in dry conditions have not been well documented for the majority of the target species, therefore the efficacy of this type of treatment is unknown.

The work of this project will be carried out over a larger geographic area, encompassing multiple land ownerships and treatment will occur on a variety of sites with highly individual characteristics. Water manipulation is highly cost-prohibitive and limited in applicability across the range of sites where treatment could occur. Additionally, this method of treatment may cause negative impacts on native or desirable species.

Given the cost of installing and maintaining equipment used in water level manipulations, and limited understanding of the likelihood for success, this method has been eliminated.

D. No Action

The species targeted through this project were chosen due to their limited distribution and the potential for negative economic, social and biological impacts as a result of their introduction and spread. Many of these plants are found in high-value areas including coastal wetlands and waterfowl management areas which provide both essential habitat for native species and immense recreational value. Increases in populations of invasive species such as flowering rush, parrot feather and European frog-bit will result in reductions of native aquatic vegetation which serves as an important resource for migratory birds and other wildlife. Additionally, these aquatic species, if untreated, fill the water column resulting in decreased oxygen levels and subsequent die-offs of native fish and aquatic organisms. The impacts of these plants extend far beyond the ecological as infestations result in loss of recreational opportunity.

The goal of this work is to detect species occurrences early and respond immediately so as to enhance the likelihood for successful eradication of infestation and enhanced capacity for limiting spread. With no action, small or localized populations may become larger populations that will eventually grow to a point where management and control are no longer feasible or effective.

V. Federally-listed Threatened, Endangered, Proposed and Candidate Species

The scope and scale of work associated with this project presents challenges when considering impacts to threatened and endangered species. In light of these challenges, all necessary and available precautions to protect listed species and limit disturbances will be undertaken during the planning and implementation of control methods.

Using available resources provided through the Michigan Natural Features Inventory, including a database of known occurrences of federally- and state-listed species and a habitat rarity index, staff conduct a site-based review for presence/absence of listed species and assess treatment options to ensure minimal impact. These resources are compiled through long-term monitoring data, verification of rare species reports and routine data collection. Additionally, during site assessment, field staff will note the presence of federally listed species and evaluate impacts of potential management before initiating control actions.

Primary herbicide application methods utilized on this project are targeted and designed to be selective. Applications are conducted through the use of hand-held sprayers as opposed to larger boom sprayers or aerial spraying to allow operators greater control of herbicide release and to treat only targeted species. In this way, we minimize the impacts to non-target species and reduce likelihood of disturbing federally listed species.

VI. Environmental Impacts

Over the course of this project, a number of herbicides will be used in the treatment of aquatic invasive species. Toxicity levels and risks to fish and wildlife are discussed for each herbicide in the section below. Each of these herbicides has been registered by the U.S. Environmental Protection Agency following a review of toxicity, risk and effects. Additionally, the herbicides we intend to use on this project have been selected from a list of those approved by the Michigan Department of Environmental Quality (DEQ) for safe use in aquatic environments. Each of these herbicides has undergone additional review which examines the toxicity of the base chemical, any adjuvants and post-degradation products. See Appendix A. for a complete list of DEQ approved herbicides.

A. Chelated Copper (Cutrine Ultra)

Chelated copper is a form of elemental copper used in the treatment of algae and submerged aquatic weeds. The herbicide inhibits plant cell growth in plants that are sensitive to copper. Although copper is a trace element in the environment, risk assessments by the EPA have shown some acute risks to aquatic organisms, though little risk to terrestrial wildlife or humans.

Studies on acute toxicity have shown that copper and chelated copper are of moderate toxicity to birds and mammals. The LD50 for bobwhite quail in acute oral studies was 98mg/kg and in acute dietary studies 991 ppm. In mammals, the LD50 for acute oral toxicity in rats was 114mg/kg. As copper is a trace element and a dietary need for most wildlife, many species exposed to large quantities of copper in the environment develop mechanisms for storing and metabolizing excess copper. No adverse effects were noted in chronic studies, though some species exhibited lower survival of young.

Copper, particularly in the aquatic environment, poses greatest risk to freshwater fish and mollusks. Copper is highly persistent in the environment, with no known half-life. When used as an herbicide in the aquatic environment, copper deposits rapidly in the soil and does not remain in the water column, however binding of copper ions in gill tissue poses risk to a number of fish species. Studies by the Bureau of Land Management found that salmonids were significantly impacted by the use of copper. The level of toxicity to any aquatic organism is highly variable based upon a number of water conditions including pH and alkalinity. Using copper in soft water with a neutral pH and low dissolved oxygen can greatly enhance the risk to fish and aquatic animals.

Though classified as practically non-toxic to moderately toxic, the EPA recommends only partial treatment of a water body and 10-14 days between treatments to reduce risk to aquatic life. Additionally, the EPA has imposed maximum annual rates for treatment.

B. Diquat (Reward)

Diquat is a quick-acting, non-selective, contact herbicide found to be an effective treatment for aquatic weed control and is approved for this purpose. The chemical is moderately toxic to humans and animals.

The LD50 for rats is 120-600mg/kg when ingested and 200-400mg/kg for rabbits when exposed dermally. Ingestion of non-lethal doses resulted in loss of kidney weight and development of cataracts in dogs. Repeated dermal exposure caused redness and irritation in rabbits and results in damage to kidney tissue.

Diquat has also been shown to have noticeable effects on aquatic fish and wildlife. Diquat is absorbed from the water column into sediments and aquatic vegetation where it remains immobile. Waterfowl and other wildlife that feed upon aquatic vegetation are at risk of exposure through ingestion. In a study of young mallards, the oral LD50 was found to be 564mg/kg of body weight rendering the chemical moderately toxic to birds. The LC50 for fish varies with species but overall diquat has been found only slightly toxic to freshwater species. 96-hour LC50 for Rainbow trout is

21mg/L. The EPA states that diquat dibromide does not cause adverse effects to fish, though the reproductive success of some aquatic invertebrates may be impacted.

Due to its toxicity through dermal exposure, the EPA restricts use of treated waters for recreational, livestock or irrigation uses. Areas treated with diquat where recreational activities such as swimming or fishing may occur must be closed to these uses for 14 days following treatment. Re-treatment of aquatic environments may not occur within 14 days of the initial treatment to protect fish and aquatic organisms. Diquat is absorbed from the water quickly with a half-life in water of 48 hours making the chemical both very effective and of low risk to fish and aquatic wildlife. To limit risk, EPA also restricts the percentage of an area that may be treated in a single treatment to one-third or one-half of the dense weed areas in a water body.

C. Endothall (Hydrothol 191, Aquathol K)

Endothall is a selective contact herbicide used in the treatment of aquatic plants. The EPA classifies this herbicide as moderately toxic and imposes some water use restrictions to treated areas.

The acute oral LD50 for rats is 51mg/kg. In studies of dermal toxicity, the LD50 for rabbits was 100mg/kg. Chronic toxicity in these animals showed signs of liver and kidney damage, heightened sensitivity in eyes and skin tissues and reduced body weight in young. No evidence of carcinogenic or mutagenic effects was observed.

No information is available for toxicity in birds; however studies have shown the use of endothall dipotassium salt to be only slightly toxic to freshwater fish. The EPA determines level of concern regarding use of specific herbicides and their effects on wildlife. In chronic studies of the use of endothall dipotassium salts, the level of concern was only minimally exceeded for freshwater fish.

Endothall is rapidly degraded in the environment, limiting concerns over leaching and persistence. The half-life of endothall in soils is 4-5 days. During this time endothall is highly mobile in the soils, and as such, the EPA restricts use of the chemical adjacent to or in areas where water may be used for drinking or irrigation purposes. There are specific formulations of endothall that are highly toxic to fish and wildlife, for which the EPA imposes additional restrictions on use to mitigate risks.

D. Fluridone (Sonar One)

Fluridone is a selective systemic herbicide for use in controlling aquatic vegetation. The EPA classifies fluridone as slightly toxic. Toxicity tests have shown fluridone to have no observable lethal effects on mammals and multiple studies have shown fluridone to be only slightly or moderately toxic to aquatic organisms.

In combined feeding studies, LD50 for rats and mice was found to be greater than 10,000 mg/kg, rendering fluridone not acutely toxic. Oral LD50 values for cats and dogs were found to be >250 and >500mg/kg respectively, which the EPA classifies as moderately toxic. Chronic exposure in mice produced some observable adverse effects at the highest dosage levels including decreased body

and organ weights. Chronic exposure tests on dogs showed no evidence of carcinogenicity, however significant increases in liver weight were observed in males at the highest dosage (400mg/kg/day). The NOAEL for dogs was determined to be 150mg/kg/day. Some reproductive effects, including decreased maternal weight gain and increased abortion rate were observed at 300mg/kg/day in rabbits.

Fluridone is practically non-toxic to waterfowl, with LC50 values in mallards >5,000mg/kg/8 days. No observable effects were found in studies with long-term feeding. Fluridone is somewhat more toxic to freshwater fish, with values ranging based on species. Studies with rainbow trout and bluegill produced 96-hour LC50 values of 11.7mg/L and 2.1mg/L respectively.

Fluridone has shown low mobility in field studies and rapidly deposits in hydric soils, where it is absorbed through the roots and shoots of aquatic vascular plants. Photo degradation of fluridone occurs in 1-6 days, reducing time of exposure for aquatic organisms. Field studies have shown that fluridone may persist in sediments for up to 17 weeks. After treatment, fluridone may dissipate from water in 20 days and from pond soils in 3 months. Due to its low mobility in soils and rapid degradation, fluridone is unlikely to contaminate groundwater or travel from treatment sites. Based on the low level of toxicity to humans and animals, the EPA poses no water use restrictions post-treatment. The application rate for fluridone is restricted within ¼ mile of potable water intakes so as to limit potential contamination of drinking water, though concentrations of 150ppb are allowable in potable water sources.

E. Flumioxazin (Clipper)

Flumioxazin is a broad-spectrum, contact herbicide with some formulations approved for use in aquatic environments. Flumioxazin is practically non-toxic to terrestrial mammals and moderately toxic to freshwater fish.

On studies with test animals, the LD50 for acute toxicity via consumption was greater than 5,000mg/kg for rats. Dermal exposure in rabbits caused only slight skin irritations and the LD50 was greater than 2,000mg/kg. Flumioxazin was found to have no carcinogenic or mutagenic, and only slight reproductive effects at very high doses.

Toxicity in both acute and chronic exposure has shown flumioxazin to be practically non-toxic to birds. The LD50 for mallards in chronic dietary exposure was greater than 5,620mg/kg and greater than 2,250mg/kg in bobwhite quail during acute toxicity trials. Fish are somewhat more affected by exposure to flumioxazin. The 96-hour LC50 for rainbow trout is 2.3mg/L.

Flumioxazin is designed to interrupt the production of chlorophyll in treated plants. The chemical is broken down quickly in aquatic environments by microbes, with a half-life ranging from 1-5 days depending on the pH level of the water body. There is low potential of leaching and groundwater contamination, though there is potential to affect non-target plant species. The EPA currently places no restrictions on use of treated water bodies due to the low toxicity of flumioxazin; however a 5-day restriction on irrigation is in effect. Additionally, it is recommended that a two week interval

between treatments be employed to reduce risk to fish associated with lower dissolved oxygen levels as plants decompose.

F. Glyphosate (Aquaneat, Rodeo)

Glyphosate is a non-selective herbicide with a wide variety of formulations including one that is certified for aquatic use. Glyphosate is practically non-toxic, however carries warnings for use based on risk of severe eye irritation in humans.

Glyphosate has a wide range of LD50 for test animals ranging from 1,538kg/mg to over 10,000kg/mg. At these levels, the EPA classifies glyphosate as practically non-toxic when ingested orally. Glyphosate has been tested for dermal toxicity in humans and no evidence of irritation or sensitivity resulted. In tests of chronic toxicity, no adverse effects were observed in several test species including rats, hens and dogs. Additionally, no evidence of carcinogenic, mutagenic or reproductive effects have been shown resultant of exposure to glyphosate.

Glyphosate is practically non-toxic to birds in the wild. Mallards exhibited a 96-hour LC50 of 4,500ppm. Some formulations of glyphosate are more toxic to freshwater fish than others. Formulations approved for aquatic use eliminate ingredients that enhance levels of toxicity. For these formulations, the LC50 for rainbow trout is 86mg/L. At this level, glyphosate is slightly toxic to fish.

Aquatic formulations do not use surfactants which contribute to persistence in terrestrial formulations. In water, glyphosate is immobile after treatment once it contacts the soil where it is rapidly absorbed, limiting the risk of contamination through surface or sub-surface runoff. This rapid absorption limits persistence in the water column and reduces risk of non-target effects to aquatic vegetation, as plants do not uptake glyphosate from the soil.

G. Imazamox (Clearcast)

Imazamox is used in the treatment of emergent and submergded aquatic vegetation, acting as an enzyme inhibitor that immediately prevents new growth while treated plants slowly die and decompose. Due to the nature of the chemical and it's persistence in the terrestrial environment, the EPA limits the rate of application. At the seasonal limits, toxicity thresholds are not reached for fish and other wildlife. Due to low toxicity at application limits, the EPA places no restrictions on use of treated areas immediately following treatment.

Avian LD50 values are in excess of 1,950mg/kg for acute oral toxicity, with no adverse reproductive effects observed. Rainbow trout LC50 values were greater than 122mg/L. At these levels imazamox is practically non-toxic. Similar results were shown for terrestrial animals; again, no toxicity thresholds were reached at the seasonal application limit.

Imazamox is moderately to highly persistent in both water and in soil. Studies specifically conducted with Clearcast, the aquatic formulation of imazamox, have shown that although degradation of the

chemical in water can take only 6-7 hours, persistence in the soil can range from 15-130 days. Field studies resulted in little to no evidence of groundwater contamination.

H. Imazapyr (Habitat)

Imazapyr is a non-selective herbicide used for treatment of numerous plant species and has been approved for use in aquatic environments against riparian and emergent plants. Imazapyr is only slightly toxic to fish and wildlife however is incredibly non-selective and persistent in soil posing risk to non-target plant species.

The LD50 for rats when ingested is greater than 5,000mg/kg and the dermal LD50 for rabbits is greater than 2,000mg/kg. Non-lethal exposure has not been shown to impact organ tissues, though irritation, lesions and congestion of the gastrointestinal tract can occur. There has been no evidence of carcinogenic, mutagenic or reproductive effects associated with exposure to imazapyr.

The LD50 for mallards and quails is greater than 2,150mg/kg. Imazapyr degrades rapidly in water with a half-life of less than two days, which minimizes exposure risk to fish and aquatic organisms. Imazapyr is slightly toxic to fish with an LC50 for rainbow trout greater than 100mg/L.

The most substantial risk when using imazapyr is the effect on non-target species. Imazapyr is slow-acting and may not metabolize fully in vegetation. When used in the terrestrial or riparian environment, excess imazapyr may remain active in the soil for over one year, transferring to the roots of adjacent vegetation and potentially spreading to groundwater. To mitigate these risks, treatments with imazapyr may only occur in ½ of the area of the water body with 10-14 days between treatments, may not occur in areas with no emergent vegetation, and may not occur less than ½ mile upstream or within ½ mile of standing water of an active irrigation or water intake site.

I. Triclopyr (Renovate 3, Navitrol)

Triclopyr is a selective herbicide commonly used to treat broadleaf and woody plants. There are many formulations of triclopyr herbicides, of which some are designed for aquatic use. Toxicity of formulations may vary, however the base formulation is only slightly toxic to humans and animals.

The LD50 for rats ranges from 630 to 729mg/kg when the product is ingested. Rabbits exposed dermally to triclopyr exhibited an LD50 of greater than 2000mg/kg. Inhaling triclopyr was not lethal but individuals did exhibit nasal irritation. Chronic exposure to ingestion of triclopyr resulted in liver and kidney tissue damage at very high doses in rats and mice. There has been little evidence of carcinogenic, mutagenic or reproductive effects from exposure to triclopyr in test animals.

Triclopyr is only slightly toxic to waterfowl and freshwater fish. The LD50 for mallards is 1,698mg/kg. Toxicity in fish is highly variable among species; however for most freshwater species the compound is practically non-toxic. The 96-hour LC50 for rainbow trout is 117ppm.

Triclopyr is not readily absorbed by soil in aquatic environments and remains mobile. Studies have shown that despite this mobility, triclopyr does not contaminate groundwater and is broken down rather quickly by sunlight and soil microorganisms. The half-life of triclopyr in water is 12-84 hours, providing minimal exposure risks to fish and aquatic organisms. Due to low toxicity to both humans and animals, the EPA does not restrict treatment area or re-entry of treated sites.

J. 2,4-D (Navigate)

2, 4-D is a selective herbicide used primarily in the treatment of broadleaf plants, both in the terrestrial and aquatic environment. 2,4-D is widely available in a number of formulations, many of which are of moderate toxicity to wildlife.

Due to the large variety of formulations of 2,4-D, the range of toxicity is highly variable. In studies of acute oral toxicity, 2,4-D was found to be of low toxicity to rats and bobwhite quail, with LD50 values ranging from 639-1,646mg/kg. Dermal toxicity was tested in rabbits, which exhibited an LD50 value of greater than 2,000mg/kg, consistent with low toxicity. 2,4-D was found to be highly toxic as an eye irritant in tests with rabbits. Some mammal species showed greater sensitivity to 2,4-D in dietary studies, including rats, cats and dogs. These species showed signs of poisoning including vomiting, diarrhea and convulsions, as well as long-term effects including reduced weight gain, reduced motor function, reduced reproductive success and skeletal deformities.

In the aquatic environment, 2,4-D was shown to be practically non-toxic to species of freshwater fish. The LC50 for rainbow trout is 377mg/L.

2,4-D is moderately persistent in the environment as the chemical does not readily bind to soil particles. Variations in formulation of the chemical as well as the composition, pH and temperature of the soil create variable rates of degradation. The range of half-lives is between 10 days to several months. There is a low potential for leaching of 2,4-D into groundwater and some adjacent crops may be adversely affected. Similarly with water, that half-life varies with pH, temperature and the formulation used. The range of half-lives from laboratory studies is 15-333 days. Though the overall toxicity to humans and wildlife is low, the EPA does impose some restrictions to mitigate risks, particularly risks to freshwater fish and aquatic organisms, as well as humans in part due to 2,4-D being highly corrosive to eye tissue. The EPA restricts recreational use of treated water bodies for 24 hours following treatment. Additionally, it is recommended that only 1/2 to 1/3 of a water body be treated in a single application to provide refugia and maintain dissolved oxygen levels.

VII. References

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DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION

**AQUATIC PESTICIDES AND RELATED PRODUCTS
CURRENTLY APPROVED FOR USE IN WATERS OF THE STATE**

The following products are currently registered with the U.S. Environmental Protection Agency (USEPA) and the Michigan Department of Agriculture and Rural Development (DARD), and have been approved for use in the waters of the state by the Michigan Department Environmental Quality (DEQ). A permit may be required prior to treatment. Additional products may be approved in the future, pending registration with USEPA and MDARD and satisfactory review by DEQ.

BRAND NAME	REGISTRANT	Liquid or Granular	EPA REGISTRATION NUMBERS	MAXIMUM APPLICATION RATE ¹
<i>Reminder: You should confirm that the product you purchase is labeled for your application site.</i>				
<i>+ Indicates that product is in the process of being discontinued and supplies may be limited.</i>				
ALGAECIDES				
CHELATED COPPER				
AIRMAX ALGAE DEFENSE	AIRMAX ECO-SYSTEMS INC	L	83742-1	0.7 gal/acre-foot, 1.7 gal/acre-foot (macroalgae only)
ALGI-CURE ALGAECIDE	APPLIED BIOCHEMISTS INC	L	7364-09-8959	1.06 gal/acre-foot, 2.13 gal/acre-foot (macroalgae only)
ALGIMYCIN PWF ALGAECIDE/CYANOBACTERIOCID	APPLIED BIOCHEMISTS INC	L	7364-09-8959	1.06 gal/acre-foot, 2.13 gal/acre-foot (macroalgae only)
CAPTAIN LIQUID COPPER ALGAECIDE CAPTAIN XTR	SEPRO	L	67690-9	0.6 gal/acre-foot, 1.2 gal/acre-foot (macroalgae only)
CUTRINE-PLUS ALGAECIDE/HERBICIDE	APPLIED BIOCHEMISTS INC	L	8959-10	0.6 gal/acre-foot, 1.2 gal/acre-foot (macroalgae only)
CUTRINE-PLUS GRANULAR ALGAECIDE	APPLIED BIOCHEMISTS INC	G	8959-12	60 lbs/acre
CUTRINE ULTRA	APPLIED BIOCHEMISTS INC	L	8959-53	0.6 gal/acre-foot, 1.2 gal/acre-foot (macroalgae only)
FORMULA F-30 ALGAE CONTROL	DIVERSIFIED WATERSCAPES INC	L	27588-2	2.0 gal/acre-foot
K-TEA ALGAECIDE	SEPRO	L	67690-24	0.7 gal/acre-foot, 1.7 gal/acre-foot (macroalgae only)
SECLEAR ALGAECIDE	SEPRO	L	67690-55	1.0 - 6.4 gal/acre-foot
SYMMETRY NXG ALGAECIDE	PHOENIX ENVIRONMENTAL CARE LLC	L	81943-2	0.7 gal/acre-foot, 1.7 gal/acre-foot (macroalgae only)
COPPER				
AQUATROLS RADIANCE ALGICIDE FOR LAKES AND PONDS	AQUATROLS	L	64962-1-83940	0.33 gal/acre-foot, 0.55 gal/acre-foot (macroalgae only)
ALONGLIFE	LIFE SCIENCE GROUP INC	L	88930-1	0.33 - 5.5 gal/acre-foot
COPPER SULFATE ²	VARIOUS	G	various	2.6 lbs/acre-foot, 4.4 lbs/acre-foot (macroalgae only)
EARTHTEC ALGICIDE/BACTERICIDE	EARTH SCIENCE LABORATORIES INC	L	64962-1	0.33 gal/acre-foot, 0.55 gal/acre-foot (macroalgae only)
ENDOTHALL, AMINE SALTS				
HYDROTHOL 191 AQUATIC ALGICIDE & HERBICIDE	UNITED PHOSPHORUS INC	L	70506-175	2.2 pints/acre-foot
HYDROTHOL GRANULAR AQUATIC ALGICIDE & HERBICIDE ³	UNITED PHOSPHORUS INC	G	70506-174	11 lbs/acre-foot

BRAND NAME	REGISTRANT	Liquid or Granular	EPA REGISTRATION NUMBERS	MAXIMUM APPLICATION RATE ¹
SODIUM CARBONATE PEROXYHYDRATE				
GREENCLEAN GRANULAR ALGAECIDE	BIOSAFE SYSTEMS LLC	G	70299-4	17 lbs/acre-foot, 170 lbs/acre-foot (heavy algae growth)
GREENCLEAN PRO GRANULAR ALGAECIDE/FUNGICIDE	BIOSAFE SYSTEMS LLC	G	70299-6	9 lbs/acre-foot, 90 lbs/acre-foot (heavy algae growth)
PAK 27 ALGAECIDE	SEPRO	G	68660-9-67690	3.0 - 100 lbs/acre-foot
PHYCOMYCIN SCP ALGAECIDE AND OXIDIZER	APPLIED BIOCHEMISTS INC	G	68660-9-8959	3.0 - 100 lbs/acre-foot
HERBICIDES				
2,4-DICHLOROPHOENOXYACETIC ACID (2,4-D)				
AQUACIDE PELLETS AQUATIC HERBICIDE ³	AQUACIDE COMPANY	G	5080-2	15-60 lbs/acre-foot (depending on treatment area and time of application)
NAVIGATE ³	APPLIED BIOCHEMISTS INC	G	228-378-8959	old (acre basis label): 100 lbs/acre (milfoil), 200 lbs/acre (coontail, lilies) new (acre-foot basis label): 28.4 - 56.8 lbs/acre-foot (milfoil), 21 lbs/acre (lilies)
SCULPIN G AQUATIC HERBICIDE	SEPRO	G	67690-49	16.3 - 65.4 lbs/acre-foot
2,4-DICHLOROPHOENOXYACETIC ACID (2,4-D) AND TRICLOPYR				
RENOVATE LZR MAX AQUATIC HERBICIDE RENOVATE MAX G3 AQUATIC HERBICIDE	SEPRO	G	67690-50	4.7 - 93.7 lbs/acre-foot
CHELATED COPPER				
COPPER EDA AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	L	8959-54	3.3 gal/acre-foot
PHOENIX CURRENT AQUATIC HERBICIDE	PHOENIX ENVIRONMENTAL CARE LLC	L	81943-1	3.3 gal/acre-foot
HARPOON AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	L	8959-54	3.3 gal/acre-foot
HARPOON GRANULAR AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	G	8959-55	40-80 lbs/acre-foot of plant height
KOMEEN AQUATIC HERBICIDE	SEPRO	L	67690-25	3.34 gal/acre-foot
KOMEEN CRYSTAL	SEPRO	G	67690-60	7.7 - 15.5 lbs/acre-foot
NAUTIQUE AQUATIC HERBICIDE	SEPRO	L	67690-10	3.0 gal/acre-foot
AIRMAX PONDWEED DEFENSE	AIRMAX ECO-SYSTEMS INC	L	83742-2	3.3 gal/acre-foot
DIQUAT DIBROMIDE⁴				
ALLIGARE DIQUAT HERBICIDE	ALLIGARE LLC	L	81927-35	2 gal/acre
DIQUASH LANDSCAPE AND AQUATIC HERBICIDE	SHARDA USA LLC	L	83529-12	2 gal/acre
HARVESTER LANDSCAPE AND AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	L	100-1091-8959	2 gal/acre
HELM DIQUAT AQUATIC AND LANDSCAPE HERBICIDE	HELM AGRO US INC	L	74530-25	2 gal/acre
KNOCKOUT	SYNGENTA CROP PROTECTION INC	L	100-1091	2 gal/acre
LITTORA AQUATIC HERBICIDE	SEPRO	L	67690-53	2 gal/acre
NUFARM DIQUAT SPC 2L LANDSCAPE AND AQUATIC HERBICIDE NUFARM DIQUAT 2L HERBICIDE	NUFARM AMERICAS INC	L	228-675	2 gal/acre
PHOENIX REDWING LANDSCAPE AND AQUATIC HERBICIDE	PHOENIX ENVIRONMENTAL CARE LLC	L	81943-23	2 gal/acre
REWARD LANDSCAPE AND AQUATIC HERBICIDE	SYNGENTA CROP PROTECTION INC	L	100-1091	2 gal/acre
SOLERA DIQUAT LANDSCAPE AND AQUATIC HERBICIDE	SOLERA ATO LLC	L	82542-14-84237	2 gal/acre
TRIBUNE HERBICIDE	SYNGENTA CROP PROTECTION INC	L	100-1390	2 gal/acre
TSUNAMI LANDSCAPE AND AQUATIC HERBICIDE	SANCO INDUSTRIES	L	83190-3-72838	2 gal/acre

BRAND NAME	REGISTRANT	Liquid or Granular	EPA REGISTRATION NUMBERS	MAXIMUM APPLICATION RATE ¹
ULTRA PONDWEED DEFENSE	AIRMAX ECO-SYSTEMS	L	82542-14-83742	2 gal/acre
WEEDTRINE -D- AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	L	8959-9	10 gal/acre
ENDOTHALL, AMINE/DIPOTASSIUM SALTS				
AQUATHOL K AQUATIC HERBICIDE	UNITED PHOSPHORUS INC	L	70506-176	1.9 gal/acre-foot
AQUATHOL SUPER K GRANULAR AQUATIC HERBICIDE ³	UNITED PHOSPHORUS INC	G	70506-191	13.2 lbs/acre-foot
HYDROTHOL 191 AQUATIC ALGICIDE & HERBICIDE	UNITED PHOSPHORUS INC	L	70506-175	1 gal/acre
HYDROTHOL GRANULAR AQUATIC ALGICIDE & HERBICIDE ³	UNITED PHOSPHORUS INC	G	70506-174	dependent on target species (see product label) and DEQ approval
FLUMIOXAZIN				
CLIPPER HERBICIDE	VALENT USA CORPORATION	G	59639-161	0.53 - 2.1 lbs/acre-foot (submergent) 12.0 ounces/acre-foot (emergent) 6.0 -
FLURIDONE⁵				
AVAST! SC AQUATIC HERBICIDE	SEPRO	L	67690-30	6 parts per billion
RESTORE S.M.A.R.T. AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	L	8959-57	6 parts per billion
SONAR A.S. AQUATIC HERBICIDE	SEPRO	L	67690-4	6 parts per billion
SONAR GENESIS	SEPRO	L	67690-54	6 parts per billion
SONAR PR PRECISION RELEASE	SEPRO	G	67690-12	6 parts per billion
SONAR Q AQUATIC HERBICIDE	SEPRO	G	67690-3	6 parts per billion
SONAR SRP AQUATIC HERBICIDE	SEPRO	G	67690-3	6 parts per billion
SONAR RTU AQUATIC WEED HERBICIDE FOR PONDS	SEPRO	L	67690-48	6 parts per billion
SONARONE AQUATIC HERBICIDE	SEPRO	G	67690-45	6 parts per billion
WHITECAP SC AQUATIC HERBICIDE	TESSENDERLO KERLEY	L	61842-11	6 parts per billion
GLYPHOSATE				
ACCORD CONCENTRATE HERBICIDE	DOW AGROSCIENCES LLC	L	62719-324	6.0 pints/acre
AQUA NEAT AQUATIC HERBICIDE	NUFARM AMERICAS INC	L	228-365	6.0 pints/acre
AQUAMASTER HERBICIDE	MONSANTO CO	L	524-343	6.0 pints/acre
AQUAPRO HERBICIDE	SEPRO	L	62719-324-67690	6.0 pints/acre
AQUA STAR	ALBAUGH, INC	L	42750-59	6.0 pints/acre
PHOENIX AVOCET AQUATIC HERBICIDE	PHOENIX ENVIRONMENTAL CARE LLC	L	81943-5	6.0 pints/acre
GLYFOS AQUATIC HERBICIDE	CHEMINOVA A/S	L	4787-34	6.0 pints/acre
REFUGE HERBICIDE	SYNGENTA CROP PROTECTION LLC	L	100-1362	6.0 pints/acre
RODEO	DOW AGROSCIENCES LLC	L	62719-324	6.0 pints/acre
SHORE-KLEAR AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	L	228-365-8959	6.0 pints/acre
SHORELINE DEFENSE	AIRMAX ECO-SYSTEMS INC	L	42750-59-83742	6.0 pints/acre
GLYPHOSATE PLUS SURFACTANT				
GLYPHOMATE 41 WEED AND GRASS KILLER PLUS AQUATIC HERBICIDE	PBI/GORDON CORPORATION	L	2217-847	dependent on target species (see product label) and DEQ approval
SHOREKLEAR-PLUS AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	L	228-367-8959	2.6 gal/acre broadcast, 2.75% spot treatment

BRAND NAME	REGISTRANT	Liquid or Granular	EPA REGISTRATION NUMBERS	MAXIMUM APPLICATION RATE ¹
IMAZAMOX				
CLEARCAST	BASF CORPORATION SEPRO	L	241-437 241-437-67690	2 qts/acre (foliar broadcast), 173 oz/acre-foot (submerged), up to 5% by volume (foliar spot treatment)
IMAZAPYR				
PHOENIX GULLWING AQUATIC HERBICIDE	PHOENIX ENVIRONMENTAL CARE LLC	L	81943-17	dependent on target species (see product label) and DEQ approval
HABITAT HERBICIDE	BASF CORPORATION SEPRO	L	241-426 241-426-67690	dependent on target species (see product label) and DEQ approval
NUFARM POLARIS AC COMPLETE HERBICIDE	NUFARM AMERICAS INC	L	228-570	dependent on target species (see product label) and DEQ approval
NUFARM POLARIS HERBICIDE	NUFARM AMERICAS INC	L	228-534	dependent on target species (see product label) and DEQ approval
PENOX SULAM⁵				
GALLEON SC AQUATIC HERBICIDE	SEPRO	L	67690-47	consult with DEQ and SEPRO
TRICLOPYR				
NAVITROL DPF AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	G	228-597-8959	67 lbs/acre-foot
NAVITROL LANDSCAPE AND AQUATIC HERBICIDE	APPLIED BIOCHEMISTS INC	L	8959-56	2.3 gal/acre-foot
RENOVATE 3 AQUATIC HERBICIDE	SEPRO	L	62719-37-67690	2.3 gal/acre-foot
RENOVATE LZR AQUATIC HERBICIDE RENOVATE OTF	SEPRO	G	67690-42	67 lbs/acre-foot
SWIMMER'S ITCH				
COPPER SULFATE				
COPPER SULFATE CRYSTALS ⁶	CHEM ONE LTD	G	56576-1	2 lbs/1000 sq. feet
OTHER				
ADJUVANTS, SINK/DRIFT CONTROL				
AGRI-DEX	HELENA CHEMICAL COMPANY	L	N/A	4.0 pints/acre
CYGNET PLUS	BREWER INTERNATIONAL	L	N/A	2.5 pints/acre-foot
POLYAN	BREWER INTERNATIONAL	L	N/A	1.0 gal/acre-foot
TOPFILM	BIOSORB INC	L	N/A	1.0 pint/acre
SHADE PRODUCTS (DYES)				
DYE PRODUCTS LABELED AS HERBICIDES⁷				
ADMIRAL LIQUID	BECKER UNDERWOOD	L	67064-2	0.25 gal/acre-foot
ADMIRAL WSP	BECKER UNDERWOOD	G	67064-1	0.25 gal/acre-foot
AQUASHADE AQUATIC PLANT GROWTH CONTROL	APPLIED BIOCHEMISTS	L	33068-1	0.25 gal/acre-foot
DYE PRODUCTS NOT LABELED AS HERBICIDES (MANY)				
EXAMPLE: CYGNET SELECT	CYGNET ENTERPRISES	L	N/A	0.25 gal/acre-foot
FORMULA F-40	DIVERSIFIED WATERSCAPES INC	L	N/A	0.25 gal/acre-foot

BRAND NAME	REGISTRANT	Liquid or Granular	EPA REGISTRATION NUMBERS	MAXIMUM APPLICATION RATE ¹
¹ Maximum rate generally approved by the DEQ. Actual rate required for control may depend on the target species and other site-specific conditions. Refer to product label.				
² Various copper sulfate products registered with the DARD (517-373-9750) may be used.				
³ Granular endosulfan and granular 2,4-D products may not be applied within 75 feet of any well OR within 250 feet of wells less than 30 feet deep. Isolation distances are measured from the well location, not the shoreline.				
⁴ Diquat dibromide products are on Michigan DARD's restricted use pesticide list. You must be a certified applicator to purchase and use these products in waters of the state, except for small ponds that have no outflow and are under the control of the user.				
⁵ Fluridone and penoxsulam use may be subject to Lake Management Plan and/or Evaluation protocols. Contact DEQ for current guidelines.				
⁶ The medium granular size should be used.				
⁷ Only dyes that are labeled as herbicides must be registered with the USEPA and DARD. Dye product labels which claim herbicidal properties cannot be used in waterbodies where there is an outflow.				

Aqua Neat[®]

Aquatic Herbicide

FOR USE ON EMERGED AQUATIC WEEDS AND BRUSH IN AQUATIC SITES. FOR USE IN FORESTRY (INCLUDING WEED CONTROL IN CHRISTMAS TREE PLANTATIONS), RIGHTS-OF-WAY, HABITAT RESTORATION AREAS, NON-CROP AND OTHER LISTED APPLICATION SITES.

ACTIVE INGREDIENT:

Glyphosate, N-(phosphonomethyl)glycine,
in the form of its isopropylamine salt*

53.8%

OTHER INGREDIENTS:

46.2%

TOTAL:

100.0%

*Contains 648 grams per litre or 5.4 pounds per U.S. gallon of the active ingredient, glyphosate, in the form of its isopropylamine salt. Equivalent to 480 grams per litre or 4 pounds per U.S. gallon of the acid, glyphosate.

KEEP OUT OF REACH OF CHILDREN CAUTION / PRECAUCION

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.)

SEE INSIDE BOOKLET FOR FIRST AID AND
ADDITIONAL PRECAUTIONARY STATEMENTS

For Chemical Spill, Leak, Fire, or
Exposure, Call CHEMTREC
(800) 424-9300

For Medical Emergencies Only,
Call (877) 325-1840

EPA Reg. No. 228-365

Manufactured for
Nufarm Americas Inc.
150 Harvester Drive
Burr Ridge, IL 60527



**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION / PRECAUCION**

Harmful if inhaled. Avoid breathing spray mist. Remove contaminated clothing and wash clothing before reuse. Wash thoroughly with soap and water after handling.

FIRST AID	
IF INHALED	<ul style="list-style-type: none">• 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.
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-877-325-1840 for emergency medical treatment information.	

PERSONAL PROTECTIVE EQUIPMENT (PPE):

Applicators and other handlers must wear long-sleeved shirt and long pants and shoes plus socks. 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 exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

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

USER SAFETY RECOMMENDATIONS
<p>Users Should:</p> <ul style="list-style-type: none">• 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.

ENVIRONMENTAL HAZARDS

For aquatic uses, do not contaminate water when disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

For terrestrial uses, do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark.

In case of, SPILL OR LEAK, soak up and remove to a landfill. Do not contaminate water when disposing of equipment washwaters or rinsate.

PHYSICAL OR CHEMICAL HAZARDS

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

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read the entire label before using this product. Use strictly in accordance with label precautionary statements and directions.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protection equipment (PPE) and Restricted-Entry Interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the Restricted-Entry Interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is: coveralls, shoes plus socks, and chemical-resistant gloves Category A (such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber) > 14 mils.

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses. Keep people and pets off treated areas until spray solution has dried to prevent transfer of this product onto desirable vegetation.

PRODUCT INFORMATION

DO NOT APPLY THIS PRODUCT USING AERIAL SPRAY EQUIPMENT EXCEPT UNDER CONDITIONS AS SPECIFIED WITHIN THIS LABEL OR CURRENT SUPPLEMENTAL LABELING ISSUED BY MANUFACTURER.

This product, a water-soluble liquid, mixes readily with water and nonionic surfactant to be applied as a foliar spray after dilution and thoroughly mixing with water in accordance with label instructions for the control or destruction of many herbaceous and woody plants. Always use the higher rate of this product per acre within the specified range when vegetation is heavy or dense. When treating dense multi-canopied sites or woody vegetation or difficult-to-control herbaceous or woody plants.

This product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days but on most perennial brush species may not occur for 7 days or more. Extremely cool or cloudy weather following treatment may slow the activity of this product and delay visual effects of control. Visible effects are a gradual wilting and yellowing of the plant which advances to complete browning of above-ground growth and deterioration of underground plant parts.

Unless otherwise directed on this label, delay application until vegetation has emerged and reached the stages described for control of such vegetation under the "WEEDS CONTROLLED" section of this label.

Unemerged plants arising from unattached underground rhizomes or root stocks of perennials or brush will not be affected by the spray and will continue to grow. For this reason best control of most perennial weeds or brush is obtained when treatment is made at late growth stages approaching maturity.

Always use the higher rate of this product per acre within the specified range when vegetation is heavy or dense.

Do not treat weeds or brush under poor growing conditions such as drought stress, disease or insect damage, as reduced control may result. Reduced results may also occur when treating weeds or brush heavily covered with dust.

Reduced control may result when applications are made to any weed or brush species that have been mowed, grazed or cut, and have not been allowed to regrow to the recommended stage for treatment.

Rainfall or irrigation occurring within 6 hours after application may reduce effectiveness. Heavy rainfall or irrigation within 2 hours after application may wash the product off the foliage and a repeat treatment may be required.

Mixing this product with herbicides or other materials not instructed in this label may result in reduced performance. However, unless otherwise prohibited on this label or the label of an intended tank mix product may be applied in combination with any herbicide registered for the same site, timing, and method of application. Observe the most restrictive label statements of various tank mix products used. **TO THE FULLEST EXTENT PERMITTED BY LAW, BUYER AND ALL USERS ARE RESPONSIBLE FOR ALL LOSS OR DAMAGE IN CONNECTION WITH THE USE OR HANDLING OF MIXTURES OF THIS PRODUCT OR OTHER MATERIALS THAT ARE NOT EXPRESSLY SPECIFIED IN THIS LABEL.**

For best results, spray coverage should be uniform and complete. Do not spray weed foliage to the point of runoff.

When this product comes in contact with soil (on the soil surface or as suspended soil or sediment in water) it is bound to soil particles. Under labeled use situations, once this product is bound to soil particles, it is not available for plant uptake and will not harm off-site vegetation where roots grow into the treatment area or if the soil is transported off-site. Under labeled use conditions, the strong affinity of this product to soil particles prevents this product from leaching out of the soil profile and entering ground water. The affinity between this product and soil particles remains until this product is degraded, which is primarily a biological degradation process carried out under both aerobic and anaerobic conditions by soil micro flora.

This product does not provide residual weed control. For subsequent residual weed control, follow a label-approved herbicide program. Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used. Read **“WARRANTY DISCLAIMER”** and **“LIMITATION OF LIABILITY”** before buying or using. If items are not acceptable, return at once unopened. Buyer and all users are responsible for all loss or damage in connection with the use of handling of mixtures of this product or other materials that are not expressly specified in this label.

For more product information, call toll-free 1 -800-852-5234.

ATTENTION

AVOID CONTACT WITH FOLIAGE, GREEN STEMS, EXPOSED NON-WOODY ROOTS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT. AVOID DRIFT. EXTREME CARE MUST BE USED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.

Do not allow the herbicide solution to mist, drip, drift or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants or other areas on which treatment was not intended. The likelihood of plant or crop injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. AVOID APPLYING AT EXCESSIVE SPEED OR PRESSURE.

NOTE: Use of this product in any manner not consistent with this label may result in injury to persons, animals or crops, or other unintended consequences. When not in use, keep container closed to prevent spills and contamination.

MIXING AND APPLICATION INSTRUCTIONS

APPLY THESE SPRAY SOLUTIONS IN PROPERLY MAINTAINED AND CALIBRATED EQUIPMENT CAPABLE OF DELIVERING DESIRED VOLUMES. HAND-GUN APPLICATIONS SHOULD BE PROPERLY DIRECTED TO AVOID SPRAYING DESIRABLE PLANTS. NOTE: REDUCED RESULTS MAY OCCUR IF WATER CONTAINING SOIL IS USED, SUCH AS WATER FROM PONDS AND UNLINED DITCHES.

TANK MIXTURES

Always predetermine the compatibility of labeled tank mixtures of this product with water carrier by mixing small proportional quantities in advance. Mix labeled tank mixtures of this product with water as follows:

1. Place a 20 to 35 mesh screen or wetting basket over filling port.
2. Through the screen, fill the spray tank one-half full with water and start agitation.
3. If a wettable powder is used, make a slurry with the water carrier, and add it SLOWLY through the screen into the tank. Continue agitation.
4. If a flowable formulation is used, premix one part flowable with one part water. Add diluted mixture SLOWLY through the screen into the tank. Continue agitation.
5. If an emulsifiable concentrate formulation is used, premix one part emulsifiable concentrate with two parts water. Add diluted SLOWLY through the screen into the tank. Continue agitation.
6. Continue filling the spray tank with water and add the required amount of this product near the end of the filling process.
7. Where nonionic surfactant is recommended, add this to the spray tank before completing the filling process.
8. Add individual formulations to the spray tank as follows: wettable powder, flowable, emulsifiable concentrate, drift control additive, water soluble liquid followed by surfactant.

Maintain good agitation at all times until the contents of the tank are sprayed. If the spray mixture is allowed to settle, thorough agitation is required to resuspend the mixture before spraying is resumed. To prevent or minimize foam, avoid the use of mechanical agitators, place the filling hose below the surface of the spray solution, terminate by-pass and return lines at the bottom of the tank and if needed use an approved anti-foam or defoaming agent.

Screen size in nozzle or line strainers should be no finer than 50 mesh. Carefully select proper nozzle to avoid spraying a fine mist. For best results with conventional ground application equipment, use flat fan nozzles.

Clean sprayer and parts immediately after using this product by thoroughly flushing with water.

For best results with conventional ground application equipment, use flat fan nozzles. Check for even distribution of spray droplets.

When using this product, mix 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution. Use a nonionic surfactant labeled for use with herbicides. The surfactant must contain 50 percent or more active ingredient.

Always read and follow the manufacturer's surfactant label instructions for best results.

These surfactants should not be used in excess of 1 quart per acre when making broadcast applications.

Colorants or marking dyes approved for use with herbicides may be added to spray mixtures of this product. Colorants or dyes used in spray solutions of this product may reduce performance, especially at lower rates or dilutions. Use colorants or dyes according to the manufacturer's label instructions.

Clean sprayer and parts immediately after using this product by thoroughly flushing with water and dispose of rinsate according to labeled use or disposal instructions.

Carefully observe all cautionary statements and other information appearing in the surfactant label.

APPLICATION EQUIPMENT AND TECHNIQUES

This product may be applied with the following application equipment:

Aerial - Fixed Wing and Helicopter

Broadcast Spray

Controlled Droplet Applicator (CDA) - Hand-held or boom-mounted applicators which produce a spray consisting of a narrow range of droplet sizes.

Hand-Held and High-Volume Spray Equipment* - Knapsack and backpack sprayers, pump-up pressure sprayers, handguns, handwands, lances and other hand-held and motorized spray equipment used to direct the spray onto weed foliage.

*This product is not registered in California or Arizona for use in mistblowers.

Selective Equipment - Recirculating sprayers and wiper applicators. See the appropriate part of this section for specific instructions and rates of application.

APPLICATION INFORMATION

Observe the following directions to minimize off-site movement during aerial application of this herbicide. Minimization of off-site movement is the responsibility of the grower, Pest Control Advisor, and aerial applicator.

AERIAL EQUIPMENT

Use the specified rates of this product and surfactant in 3 to 20 gallons of water per acre as a broadcast spray, unless otherwise specified. See the "WEEDS CONTROLLED" section of this label for specific rates. Unless otherwise specified, do not exceed 1.5 pints per acre. Aerial applications of this product may only be made as specified in this label.

AVOID DRIFT - DO NOT APPLY DURING LOW-LEVEL INVERSION CONDITIONS, WHEN WINDS ARE GUSTY OR UNDER ANY OTHER CONDITION WHICH WILL ALLOW DRIFT. DRIFT MAY CAUSE DAMAGE TO ANY VEGETATION CONTACTED TO WHICH TREATMENT IS NOT INTENDED. TO PREVENT INJURY TO ADJACENT DESIRABLE VEGETATION, APPROPRIATE BUFFER ZONES MUST BE MAINTAINED.

Coarse sprays are less likely to drift; therefore, do not use nozzles or nozzle configurations which dispense spray as fine spray droplets. Do not angle nozzles forward into the airstream and do not increase spray volume by increasing nozzle pressure above the manufacturer's instructions.

Drift control additives may be used. When a drift control additive is used, read and carefully observe the precautionary statements and all other information appearing in the additive label.

Ensure uniform application - To avoid streaked, uneven or overlapped application, use appropriate marking devices.

Thoroughly wash aircraft, especially landing gear, after each day of spraying to remove residues of this product accumulated during spraying or from spills. **PROLONGED EXPOSURE OF THIS PRODUCT TO UNCOATED STEEL SURFACES MAY RESULT IN CORROSION AND POSSIBLE FAILURE OF THE PART. LANDING GEAR ARE MOST SUSCEPTIBLE.** The maintenance of an organic coating (paint) which meets aerospace specification MIL-C-38413 may prevent corrosion.

For use of this product by air in California see additional instructions in "FOR AERIAL APPLICATION IN CALIFORNIA ONLY" Section.

FOR AERIAL APPLICATION IN CALIFORNIA ONLY

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF SPRAY WITH FOLIAGE, GREEN STEMS, OR FRUIT OF DESIRABLE CROPS, PLANTS, TREES, OR OTHER DESIRABLE VEGETATION SINCE SEVERE DAMAGE OR DESTRUCTION MAY RESULT.

Written Directions

A written direction **MUST** be submitted by or on behalf of the applicator to the Fresno County Agricultural Commissioner 24 hours prior to the application. This written direction **MUST** state the proximity of surrounding crops, and that conditions of each manufacturer's applicable product label(s) and this label have been satisfied.

Aerial Applicator Training and Equipment

Aerial application of this herbicide is limited to pilots who have successfully completed a Fresno County Agricultural Commissioner and California Department of Pesticide Regulation approved training program for aerial application of herbicides. All aircraft must be inspected, critiqued in flight, and certified at a Fresno County Agricultural Commissioner approved fly-in. Test and calibrate spray equipment at intervals sufficient to insure that proper rates of herbicides and adjuvants are being applied during commercial use. Applicator must document such calibrations and testing. Demonstration of performance at Fresno County Agricultural Commissioner approved "fly-ins" constitutes such documentation, or other written records showing calculations and measurements of flight and spray parameters acceptable to the Fresno County Agricultural Commissioner.

Application at night

Do not apply this product by air earlier than 30 minutes prior to sunrise and/or later than 30 minutes after sunset without prior permission from the Fresno County Agricultural Commissioner.

Aquatic and Other Noncrop Sites

When applied as directed and under the conditions described in the "Weeds Controlled" section of the label booklet for this product, this herbicide will control or partially control the labeled weeds growing in the following industrial, recreational and public areas, or other similar sites.

Aquatic Sites-including all bodies of fresh and brackish water which may be flowing, nonflowing or transient. This includes lakes, rivers, streams, ponds, seeps, irrigation and drainage ditches, canals, reservoirs, estuaries and similar sites.

If aquatic sites are present in the noncrop areas and are part of the intended treatment, read and observe the following directions: There is no limit on the use of treated water for irrigation, recreation or domestic purposes.

Consult local state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.

NOTE: Do not apply this product within 1/2 mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as a lake, pond or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after the application. The water intake may be turned on prior to 48 hours if the glyphosate level in the intake water is below 0.7 parts per million as determined by laboratory analysis. These aquatic applications may be made ONLY in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after application.

This product does not control plants which are completely submerged or have a majority of their foliage underwater.

AVOID DRIFT - DO NOT APPLY WHEN WINDS ARE GUSTY OR UNDER ANY OTHER CONDITION WHICH WILL ALLOW DRIFT. DRIFT MAY CAUSE DAMAGE TO ANY VEGETATION CONTACTED TO WHICH TREATMENT IS NOT INTENDED. TO PREVENT INJURY TO ADJACENT DESIRABLE VEGETATION, APPROPRIATE BUFFER ZONES MUST BE MAINTAINED.

Use the following guidelines when aerial applications are made near crops or desirable perennial vegetation after bud break and before total leaf drop, and/or near other desirable vegetation or annual crops.

1. Do not apply within 100 feet of all desirable vegetation or crop(s).
2. If wind up to 5 miles per hour is blowing toward desirable vegetation or crop(s), do not apply within 500 feet of the desirable vegetation or crop(s).
3. Winds blowing from 5 to 10 miles per hour toward desirable vegetation or crop(s) may require buffer zones in excess of 500 feet.
4. Do not apply when winds are in excess of 10 miles per hour or when inversion conditions exist.

FOR AERIAL APPLICATION IN FRESNO COUNTY, CALIFORNIA ONLY

From February 15 through March 31 only. For aerial application outside of these dates, refer to the "FOR AERIAL APPLICATION IN CALIFORNIA ONLY" section printed above.

APPLICABLE AREA

This supplement only applies to the area contained inside the following boundaries within Fresno County, California only.

North: Fresno County line
South: Fresno County line
East: State Highway 99
West: Fresno County line

BOOM EQUIPMENT

For control of weed or brush species listed in this label using conventional boom equipment - Use the specified rates of this product and surfactant in 3 to 30 gallons of water per acre as a broadcast spray, unless otherwise specified. See the "WEEDS CONTROLLED" section of this label for specific rates. As density of vegetation increases, spray volume should be increased within the specified range to ensure complete coverage. Carefully select correct nozzle to avoid spraying a fine mist. For best results with ground application equipment, use flat fan nozzles. Check for even distribution of spray droplets.

HAND-HELD AND HIGH-VOLUME EQUIPMENT

Use Coarse Sprays Only

For control of weeds listed in this label using knapsack sprayers or high-volume spraying equipment utilizing handguns or other suitable nozzle arrangements - Prepare a 0.75 to 2 percent solution of this product in water, add a nonionic surfactant and apply to foliage of vegetation to be controlled. For specific rates of application and instructions for control of various annual and perennial weeds, see the "WEEDS CONTROLLED" section in this label.

Applications should be made on a spray-to-wet basis. Spray coverage should be uniform and complete. Do not spray to point of runoff.

This product may be used as a 5 to 8 percent solution plus 0.5 to 1 fluid ounce non-ionic surfactant per gallon spray solution for low-volume directed sprays for spot treatment of trees and brush. It is most effective in areas where there is a low density of undesirable trees or brush. If a straight stream nozzle is used, start the application at the top of the targeted vegetation and spray from top to bottom in a lateral zig-zag motion. Ensure that at least 50 percent of the leaves are contacted by the spray solution. For flat fan and cone nozzles and with hand-directed mist blowers, mist the application over the foliage of the targeted vegetation. Small, open-branched trees need only be treated from one side. If the foliage is thick or there are multiple root sprouts, applications must be made from several sides to ensure adequate spray coverage.

For use in knapsack sprayers, it is suggested that the specified amount of this product be mixed with water in a large container. Fill sprayer with the mixed solution and add the correct amount of surfactant.

Prepare the desired volume of spray solution by mixing the amount of this product in water as shown in the following table:

SPRAY SOLUTION

DESIRED VOLUME	AMOUNT OF PRODUCT					
	0.75%	1.0%	1.25%	1.5%	5.0%	8.0%
1 Gallon	1.0 fl. oz.	1.33 fl. oz.	1.66 fl. oz.	2.0 fl. oz.	6.0 fl. oz.	10.25 fl. oz.
25 Gallons	1.5 pts.	1.0 qt.	1.25 qts.	1.5 qts.	5.0 qts.	2.0 gals.
100 Gallons	3.0 qts.	1.0 gals.	1.25 gals.	1.5 gals.	5.0 gals.	8.0 gals.

2 Tablespoons = 1 fluid ounce

SELECTIVE EQUIPMENT

For terrestrial application, this product may be applied through a shielded applicator, or a wiper applicator after dilution and thorough mixing with water to listed weeds growing in any non-crop site specified on this label.

- A shielded applicator directs the herbicide solution onto weeds, while shielding desirable vegetation from the herbicide.
- A wiper applicator applies the herbicide solution onto weeds by rubbing the weed with an absorbent material containing the herbicide solution.

AVOID CONTACT WITH DESIRABLE VEGETATION.

This section summarizes the general weed control spectrum and rates of application for this herbicide. Additional information specific to individual use patterns is detailed in following sections.

SPRAY DRIFT MANAGEMENT

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions. The following drift management requirements must be followed to avoid off-target drift movement from aerial applications. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most operating nozzles on the boom must not exceed 3/4 the length of the rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downward more than 45 degrees. Where states have more stringent regulations, they must be observed.

The applicator should be familiar with and take into account the information covered in the [Aerial Drift Reduction Advisory Information](#).

Importance of Droplet Size

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions sections of this label).

Controlling Droplet Size

- **Volume** - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure** - Do not exceed the nozzle manufacturer's specified pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure. Higher pressure reduces droplet size and does not improve canopy protection.
- **Number of Nozzles** - Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle Orientation** - Orienting nozzles so that the spray is released backwards, parallel to the air stream produces larger droplets than other orientations. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.
- **Boom Length** - For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.
- **Application Height** - Applications must not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

Wind

Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity

When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions

Applications must not occur during a local, low level temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of the smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas

The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g. when wind is blowing away from the sensitive areas).

WEEDS CONTROLLED

ANNUAL WEEDS

Apply to actively growing annual grasses and broadleaf weeds.

Allow at least 3 days after application before disturbing treated vegetation. After this period the weeds may be mowed, tilled or burned. See "DIRECTIONS FOR USE", "PRODUCT INFORMATION" and "MIXING AND APPLICATION INSTRUCTIONS" for labeled uses and specific application instructions.

Broadcast Application - Use 1-1/2 pints of this product per acre plus 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution, if weeds are less than 6 inches tall. If weeds are greater than 6 inches tall, use 2-1/2 pints of this product per acre plus 2 or more quarts of an approved nonionic surfactant per 100 gallons of spray solution.

Hand-Held, High-Volume Application - Use a 3/4 percent solution of this product in water plus 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution and apply to foliage of vegetation to be controlled.

When applied as directed under the conditions described in this label, this product plus nonionic surfactant WILL CONTROL the following ANNUAL WEEDS:

Balsamapple**

Momordica charantia

Barley

Hordeum vulgare

Barnyardgrass

Echinochloa crus-galli

Bassia, fivehook

Bassia hyssopifolia

Bluegrass, annual

Poa annua

Bluegrass, bulbous

Poa bulbosa

Brome*

Bromus spp.

Buttercup

Ranunculus spp.

Cheat

Bromus secalinus

Chickweed, mouseear

Cerastium vulgatum

Cocklebur

Xanthium strumarium

Corn, volunteer

Zea mays

Crabgrass

Digitaria spp.

Dwarf dandelion

Krigia cespitosa

False dandelion

Krigia cespitosa

Falseflax, smallseed

Camelina microcarpa

Fiddleneck*

Amsinckia spp.

Flax leaf fleabane*

Conyza bonariensis

Fleabane

Erigeron spp.

Foxtail

Setaria spp.

Foxtail, Carolina

Alopecurus carolinianus

Groundsel, common

Senecio vulgaris

Horseweed/Marestail

Conyza canadensis

Kochia*

Kochia scoparia

Lambsquarters, common

Chenopodium album

Lettuce, prickly*

Lactuca serriola

Morningglory

Ipomoea spp.

Mustard, blue

Chorispora tenella

Mustard, tansy

Descurainia pinnata

Mustard, tumble

Sisymbrium altissimum

Mustard, wild

Sinapis arvensis

Oats, wild

Avena fatua

Panicum*

Panicum spp.

(continued)

Pennycress, field
Thlaspi arvense
Pigweed, redroot
Amaranthus retroflexus
Pigweed, smooth
Amaranthus hybridus
Ragweed, common*
Ambrosia artemisiifolia
Ragweed, giant*
Ambrosia trifida
Rocket, London
Sisymbrium irio
Rye
Secale cereale
Ryegrass, Italian*
Lolium multiflorum

Sandbur, field
Cenchrus spp.
Shattercane
Sorghum bicolor
Shepherd's-purse
Capsella bursa-pastoris
Signalgrass, broadleaf
Brachiaria platyphylla
Smartweed, Pennsylvania
Polygonum pennsylvanicum
Sowthistle, annual*
Sonchus oleraceus
Spanishneedles*
Bidens bipinnata
Spurry, umbrella
Holosteum umbellatum

Stinkgrass
Eragrostis ciliaris
Sunflower*
Helianthus annuus
Thistle, Russian
Salsola kali
Velvetleaf*
Abutilon theophrasti
Wheat
Triticum aestivum
Witchgrass
Panicum capillare

*Apply 3 pints of this product per acre.
 **Apply with hand-held equipment only.

Annual weeds will generally continue to germinate from seed throughout the growing season. Repeat treatments will be necessary to control later germinating weeds.

PERENNIAL WEEDS

Apply this product as follows to control or destroy most vigorously growing perennial weeds. Unless otherwise directed, allow at least 7 days after application before disturbing vegetation.

See individual control instructions for specific weeds following the table. For other perennials listed on this label, apply 4-1/2 to 7-1/2 pints of product per acre as a broadcast spray or as a 3/4 to 1-1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached early head or early bud stage of growth.

Add 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution to the rates of this product given in this list. See the "PRODUCT INFORMATION", "DIRECTIONS FOR USE" and "MIXING AND APPLICATION" sections in this label for specific uses and application instructions.

NOTE: If weeds have been mowed or tilled, do not treat until regrowth has reached the recommended stages. Fall treatments must be applied before a killing frost.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed.

When applied as specified under the conditions described, this product plus surfactant WILL CONTROL the following PERENNIAL WEEDS:

Alfalfa
Medicago sativa
Alligatorweed*
Alternanthera philoxeroides
Anise/Fennel
Foeniculum vulgare
Artichoke, Jerusalem
Helianthus tuberosus
Bahiagrass
Paspalum notatum
Bermudagrass
Cynodon dactylon
Bindweed, field
Convolvulus arvensis
Bluegrass, Kentucky
Poa pratensis
Blueweed, Texas
Helianthus ciliaris
Brackenfern
Pteridium spp.
Bromegrass, smooth
Bromus inermis

Canarygrass, reed
Phalaris arundinacea
Cattail
Typha spp.
Clover, red
Trifolium pratense
Clover, white
Trifolium repens
Cogongrass
Imperata cylindrica
Cordgrass
Spartina spp.
Cutgrass, giant*
Zizaniopsis miliacea
Dallisgrass
Paspalum dilatatum
Dandelion
Taraxacum officinale
Dock, curly
Rumex crispus
Dogbane, hemp
Apocynum cannabinum

Fescue
Festuca spp.
Fescue, tall
Festuca arundinacea
Guineagrass
Panicum maximum
Hemlock, poison
Conium maculatum
Horsenettle
Solanum carolinense
Horseradish
Armoracia rusticana
Ice Plant
Mesembryanthemum crystallinum
Johnsongrass
Sorghum halepense
Kikuyugrass
Pennisetum clandestinum
Knapweed
Centaurea repens
Lantana
Lantana camara

(continued)

Lespedeza: common, services

Lespedeza striata
Lespedeza cuneata

Loosestrife, purple

Lythrum salicaria

Lotus, American

Nelumbo lutea

Maidencane

Panicum hematomon

Milkweed

Asclepias spp.

Muhly, wirestem

Muhlenbergia frondosa

Mullein, common

Verbascum thapsus

Napiergrass

Pennisetum purpureum

Nightshade, silverleaf

Solanum elaeagnifolium

Nutsedge: purple, yellow

Cyperus rotundus
Cyperus esculentus

Orchardgrass

Dactylis glomerata

Pampas grass

Cortaderia jubata

Paragrass

Brachiaria mutica

Phragmites**

Phragmites spp.

Quackgrass

Agropyron repens

Reed, giant

Arundo donax

Ryegrass, perennial

Lolium perenne

Smartweed, swamp

Polygonum coccineum

Spatterdock

Nuphar luteum

Starthistle, yellow

Centaurea solstitialis

Sweet potato, wild*

Ipomoea pandurata

Thistle, artichoke

Cynara cardunculus

Thistle, Canada

Cirsium arvense

Timothy

Phleum pratense

Torpedograss*

Panicum repens

Tules, common

Scirpus acutus

Vaseygrass

Paspalum urvillei

Velvetgrass

Holcus spp.

Waterhyacinth

Eichornia crassipes

Waterlettuce

Pistia stratiotes

Waterprimrose

Ludwigia spp.

Wheatgrass, western

Agropyron smithii

*Partial control.

**Partial control in southeastern states. See specific instructions below.

Alligatorweed - Apply 6 pints of this product per acre as a broadcast spray or as a 1-1/4 percent solution with hand-held equipment to provide partial control of alligatorweed. Apply when most of the target plants are in bloom. Repeat applications will be required to maintain such control.

Bermudagrass - Apply 7-1/2 pints of this product per acre as a broadcast spray or as a 1-1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and when seedheads appear.

Bindweed, field/Silverleaf Nightshade/Texas Blueweed - Apply 6 to 7-1/2 pints of this product per acre as a broadcast spray west of the Mississippi River and 4-1/2 to 6 pints of this product per acre east of the Mississippi River. With hand-held equipment, use a 1-1/2 percent solution. Apply when target plants are actively growing and are at or beyond full bloom. For silverleaf nightshade, best results can be obtained when application is made after berries are formed. Do not treat when weeds are under drought stress. New leaf development indicates active growth. For best results apply in late summer or fall.

Brackenfern - Apply 4-1/2 to 6 pints of this product per acre as a broadcast spray or as a 3/4 to 1 percent solution with hand-held equipment. Apply to fully expanded fronds which are at least 18 inches long.

Cattail - Apply 4-1/2 to 6 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when target plants are actively growing and are at or beyond the early-to-full bloom stage of growth. Best results are achieved when application is made during the summer or fall months.

Cogongrass - Apply 4-1/2 to 7-1/2 pints of this product per acre as a broadcast spray. Apply when cogongrass is at least 18 inches tall and actively growing in late summer or fall. Allow 7 or more days after application before tillage or mowing. Due to uneven stages of growth and the dense nature of vegetation preventing good spray coverage, repeat treatments may be necessary to maintain control.

Cordgrass - Apply 4-1/2 to 7-1/2 pints of this product per acre as a broadcast spray or as a 1 to 2 percent solution with hand-held equipment. Schedule applications in order to allow 6 hours before treated plants are covered by tidewater. The presence of debris and silt on the cordgrass plants will reduce performance. It may be necessary to wash targeted plants prior to application to improve uptake of this product into the plant.

Cutgrass, giant - Apply 6 pints of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment to provide partial control of giant cutgrass. Repeat applications will be required to maintain such control, especially where vegetation is partially submerged in water. Allow for substantial regrowth to the 7- to 10-leaf stage prior to retreatment.

Dogbane, hemp/Knapweed/Horseradish - Apply 6 pints of this product per acre as a broadcast spray or as a 1-1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the late bud-to-flower stage of growth. For best results, apply in late summer or fall.

Fescue, tall - Apply 4-1/2 pints of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the boot-to-head stage of growth. When applied prior to the boot stage, less desirable control may be obtained.

Guineagrass - Apply 4-1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when target plants are actively growing and when most have reached at least the 7-leaf stage of growth.

Johnsongrass/Bluegrass, Kentucky/Bromegrass, smooth/Canarygrass, reed/Orchardgrass/Ryegrass, perennial/Timothy/Wheatgrass, western - Apply 3 to 4-1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the boot-to-head stage of growth. When applied prior to the boot stage, less desirable control may be obtained. In the fall, apply before plants have turned brown.

Lantana - Apply this product as a 3/4 to 1 percent solution with hand-held equipment. Apply to actively growing Lantana at or beyond the bloom stage of growth. Use the higher application rate for plants that have reached the woody stage of growth.

Loosestrife, purple - Apply 4 pints of this product per acre as a broadcast spray or as a 1 to 1-1/2 percent solution using hand-held equipment. Treat when plants are actively growing at or beyond the bloom stage of growth. Best results are achieved when application is made during summer or fall months. Fall treatments must be applied before a killing frost.

Lotus, American - Apply 4 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Treat when plants are actively growing at or beyond the bloom stage of growth. Best results are achieved when application is made during summer or fall months. Fall treatments must be applied before a killing frost. Repeat treatment may be necessary to control regrowth from underground parts and seeds.

Maidencane/Paragrass - Apply 6 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Repeat treatments will be required, especially to vegetation partially submerged in water. Under these conditions, allow for regrowth to the 7- to 10-leaf stage prior to retreatment.

Milkweed, common - Apply 4-1/2 pints of this product per acre as a broadcast spray or as a 1-1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the late bud-to-flower stage of growth.

Nutsedge: purple, yellow - Apply 4-1/2 pints of this product per acre as a broadcast spray, or as a 3/4 percent solution with hand-held equipment to control existing nutsedge plants and immature nutlets attached to treated plants. Apply when target plants are in flower or when new nutlets can be found at rhizome tips. Nutlets which have not germinated will not be controlled and may germinate following treatment. Repeat treatments will be required for long-term control.

Pampasgrass - Apply a 1-1/2 percent solution of this product with hand-held equipment when plants are actively growing.

Phragmites - For partial control of phragmites in Florida and the counties of other states bordering the Gulf of Mexico, apply 7-1/2 pints per acre as a broadcast spray or apply a 1-1/2 percent solution with hand-held equipment. In other areas of the U.S., apply 4 to 6 pints per acre as a broadcast spray or apply a 3/4 percent solution with hand-held equipment for partial control. For best results, treat during late summer or fall months when plants are actively growing and in full bloom. Due to the dense nature of the vegetation, which may prevent good spray coverage and uneven stages of growth, repeat treatments may be necessary to maintain control. Visual control symptoms will be slow to develop.

Quackgrass/Kikuyugrass/Muhly, wirestem - Apply 3 to 4-1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment when most quackgrass or wirestem muhly is at least 8 inches in height (3- to 4-leaf stage of growth) and actively growing. Allow 3 or more days after application before tillage.

Reed, giant/ice plant - For control of giant reed and ice plant, apply a 1-1/2 percent solution of this product with hand-held equipment when plants are actively growing. For giant reed, best results are obtained when applications are made in late summer to fall.

Spatterdock - Apply 6 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when most plants are in full bloom. For best results, apply during the summer or fall months.

Sweet potato, wild - Apply this product as a 1-1/2 percent solution using hand-held equipment. Apply to actively growing weeds that are at or beyond the bloom stage of growth. Repeat applications will be required. Allow the plant to reach the recommended stage of growth before retreatment.

Thistle: Canada, artichoke - Apply 3 to 4-1/2 pints of this product per acre as a broadcast spray or as a 1-1/2 percent solution with hand-held equipment for Canada thistle. To control artichoke thistle, apply a 2 percent solution as a spray to wet application. Apply when target plants are actively growing and are at or beyond the bud stage of growth.

Torpedograss - Apply 6 to 7-1/2 pints of this product per acre as a broadcast spray or as a 3/4 to 1-1/2 percent solution with hand-held equipment to provide partial control of torpedograss. Use the lower rates under terrestrial conditions, and the higher rates under partially submerged or a floating mat condition. Repeat treatments will be required to maintain such control.

Tules, common - Apply this product as a 1-1/2 percent solution with hand-held equipment. Apply to actively growing plants at or beyond the seedhead stage of growth. After application, visual symptoms will be slow to appear and may not occur for 3 or more weeks.

Waterhyacinth - Apply 5 to 6 pints of this product per acre as a broadcast spray or apply a 3/4 to 1 percent solution with hand-held equipment. Apply when target plants are actively growing and at or beyond the early bloom stage of growth. After application, visual symptoms may require 3 or more weeks to appear with complete necrosis and decomposition usually occurring within 60 to 90 days. Use the higher rates when more rapid visual effects are desired.

Waterlettuce - For control, apply a 3/4 to 1 percent solution using hand-held equipment to actively growing plants. Use higher rates where infestations are heavy. Best results are obtained from mid-summer through winter applications. Spring applications may require retreatment.

Waterprimrose - Apply this product as a 3/4 percent solution using hand-held equipment. Apply to plants that are actively growing at or beyond the bloom stage of growth, but before fall color changes occur. Thorough coverage is necessary for best control.

Other perennials listed on this label - Apply 4-1/2 to 7-1/2 pints of this product per acre as a broadcast spray or as a 3/4 to 1-1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached early head or early bud stage of growth.

WOODY BRUSH AND TREES

See individual control instructions for specific woody brush and trees to be controlled in the following table. For partial control of other woody brush and trees listed in the table, apply 3 to 7.5 pints of this product per acre as a broadcast spray or as a 0.75 to 10 percent solution with hand-held equipment.

Apply the specified rate of this product plus 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution when plants are actively growing and, unless otherwise directed, after full-leaf expansion. Use the higher rate for larger plants and/or dense areas of growth. On vines, use the higher rate for plants that have reached the woody stage of growth. Best results are obtained when application is made in late Summer or Fall after fruit formation.

Applied as a 5 to 8 percent solution as a directed application as described in the "HAND-HELD AND HIGH-VOLUME EQUIPMENT" section, this product will control or partially control all species listed in this section of the label. Use the higher rate of application for dense stands and larger woody brush and trees.

In arid areas, best results are obtained when application is made in the Spring or early Summer when brush species are at high moisture content and are flowering. Ensure thorough coverage when using hand-held equipment. Symptoms may not appear prior to frost or senescence with Fall treatment.

Allow 7 or more days after application before mowing or removal. Repeat treatments may be necessary to control plants regenerating from underground parts or seed. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Reduced performance may result if Fall treatments are made following a frost.

Application Rates¹

METHOD OF APPLICATION	APPLICATION RATE	SPRAY VOLUME (Gallons/Acre)
Broadcast Aerial Ground	1.5 to 7.5 qts./ acre 1.5 to 7.5 qts./ acre	5 to 30 10 to 60
Spray-to-Wet Handgun, Backpack, Mistblower	0.75% to 2.0% by volume	Spray-to-Wet
Low Volume Directed Spray² Handgun, Backpack, Mistblower	5.0% to 10.0% by volume	Partial Coverage

¹ Where repeat applications are necessary do not exceed 8.0 quarts per acre per year.

² For low volume directed spray applications, coverage should be uniform with at least 50 percent of the foliage contacted. For best results, coverage of the top one-half of the plant is important.

NOTE: If brush has been mowed or tilled or trees have been cut, do not treat until regrowth has reached the recommended stage of growth.

When applied as specified under the conditions described, this product plus surfactant CONTROLS or PARTIALLY CONTROLS the following woody brush plants and trees:

Alder

Alnus spp.

Ash*

Fraxinus spp.

Aspen, quaking

Populus tremuloides

Bearclover, Bearmat

Chamaebatia foliolosa

Birch

Betula spp.

Blackberry

Rubus spp.

Broom:

French

Cytisus monspessulanus

Scotch

Cytisus scoparius

Buckwheat, California*

Eriogonum fasciculatum

Cascara*

Rhamnus purshiana

Catsclaw*

Acacia greggi

Ceanothus

Ceanothus spp.

Chamise

Adenostoma fasciculatum

Cherry:

Bitter

Prunus emarginata

Black

Prunus serotina

Pin

Prunus pensylvanica

Coyote brush

Baccharis consanguinea

Creeper, Virginia*

Parthenocissus quinquefolia

Dewberry

Rubus trivialis

Dogwood

Cornus spp.

Elderberry

Sambucus spp.

Elm*

Ulmus spp.

Eucalyptus, bluegum

Eucalyptus globules

Hasardia*

Haplopappus squamosus

Hawthorn

Crataegus spp.

Hazel

Corylus spp.

Hickory

Carya spp.

Holly, Florida; Brazilian Peppertree

Schinus terebinthifolius

Honeysuckle

Lonicera spp.

Hornbeam, American

Carpinus caroliniana

Kudzu
Pueraria lobata

Locust, black*
Robinia pseudoacacia

Manzanita
Arctostaphylos spp.

Maple:
Red**
Acer rubrum

Sugar
Acer saccharum

Vine*
Acer circinatum

Monkey Flower*
Mimulus guttatus

Oak:
Black*
Quercus velutina

Northern pine
Quercus palustris

Post
Quercus stellata

Red
Quercus rubra

Southern red
Quercus falcata

White*
Quercus alba

Persimmon*
Diospyros spp.

Poison Ivy
Rhus radicans

Poison Oak
Rhus toxicodendron

Poplar, yellow*
Liriodendron tulipifera

Prunus
Prunus spp.

Raspberry
Rubus spp.

Redbud, eastern
Cercis canadensis

Rose, multiflora
Rosa multiflora

Russian-olive
Elaeagnus angustifolia

Sage: black, white
Salvia spp.

Sagebrush, California
Artemisia californica

Salmonberry
Rubus spectabilis

Salt cedar*
Tamarix spp.

Saltbush, Sea myrtle
Baccharis halimifolia

Sassafras
Sassafras albidum

Sourwood*
Oxydendrum arboreum

Sumac:
Poison*
Rhus vernix

Smooth*
Rhus glabra

Winged*
Phus copallina

Sweet gum
Liquidambar styraciflua

Swordfern*
Polystichum munitum

Tallowtree, Chinese
Sapium sebiferum

Thimbleberry
Rubus parviflorus

Tobacco, tree*
Nicotiana glauca

Trumpet creeper
Campsis radicans

Waxmyrtle, southern*
Myrica cerifera

Willow
Salix spp.

*Partial control

**See below for control or partial control instruction.

See the "DIRECTIONS FOR USE" and "MIXING AND APPLICATION INSTRUCTIONS" sections in this label for labeled use and specific application instructions.

Apply the product as follows to control or partially control the following woody brush and trees.

Alder/Blackberry/Dewberry/Honeysuckle/Oak, Post/Raspberry - For control, apply 4-1/2 to 6 pints per acre as a broadcast spray or as a 3/4 to 1-1/4 percent solution with hand-held equipment.

Aspen, Quaking/Hawthorn/Trumpet creeper - For control, apply 3 to 4-1/4 pints of this product per acre as a broadcast spray or as a 3/4 to 1-1/4 percent solution with hand-held equipment.

Birch/Elderberry/Hazel/Salmonberry/Thimbleberry - For control, apply 3 pints per acre of this product as a broadcast spray or as a 3/4 percent solution with hand-held equipment.

Broom: French, Scotch - For control, apply a 1-1/4 to 1-1/2 percent solution with hand-held equipment.

Buckwheat, California/Hasardia/Monkey Flower/Tobacco, Tree - For partial control of these species apply a 3/4 to 1-1/2 percent solution of this product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.

Catsclaw - For partial control, apply a 1-1/4 to 1-1/2 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

Cherry: Bitter, Black, Pin/Oak, Southern Red/Sweet Gum/Prunus - For control, apply 3 to 7-1/2 pints of this product per acre as a broadcast spray or as a 1 to 1-1/2 percent solution with hand-held equipment.

Coyote brush - For control, apply a 1-1/4 to 1-1/2 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

Dogwood/Hickory/Salt cedar - For partial control, apply a 1 to 2 percent solution of this product with hand-held equipment or 6 to 7-1/2 pints per acre as a broadcast spray.

Eucalyptus, bluegum - For control of eucalyptus resprouts, apply a 1-1/2 percent solution of this product with hand-held equipment when resprouts are 6- to 12-feet tall. Ensure complete coverage. Apply when plants are actively growing. Avoid application to drought-stressed plants.

Holly, Florida/Waxmyrtle, southern - For partial control, apply this product as a 1-1/2 percent solution with hand-held equipment.

Kudzu - For control, apply 6 pints of this product per acre as a broadcast spray or as a 1-1/2 percent solution with hand-held equipment. Repeat applications will be required to maintain control.

Maple, Red - For control, apply as a 3/4 to 1-1/4 percent solution with hand-held equipment when leaves are fully developed. For partial control, apply 2 to 7-1/2 pints of this product per acre as a broadcast spray.

Maple, Sugar/Oak: Northern Pine, Red - For control, apply as a 3/4 to 1-1/4 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

Poison Ivy/Poison Oak - For control, apply 6 to 7-1/2 pints of this product per acre as a broadcast spray or as a 1-1/2 percent solution with hand-held equipment. Repeat applications may be required to maintain control. Fall treatments must be applied before leaves lose green color.

Rose, multiflora - For control, apply 3 pints of this product per acre as a broadcast spray or as a 3/4 to 1-1/2 percent solution with hand-held equipment. Treatments should be made prior to leaf deterioration by leaf-feeding insects.

Sage, black/Sagebrush, California/Chamise/Tallowtree, Chinese - For control of these species, apply a 3/4 percent solution with hand-held equipment. Thorough coverage of foliage is necessary for best results.

Saltbush, Sea myrtle - For control, apply this product as a 1 percent solution with hand-held equipment.

Willow - For control, apply 4-1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment.

Other woody brush and trees listed in this label - For partial control, apply 3 to 7-1/2 pints of this product per acre as a broadcast spray or as a 3/4 to 1-1/2 percent solution with hand-held equipment.

NON-CROP USES

See "PRODUCT INFORMATION" and "MIXING AND APPLICATION INSTRUCTIONS" sections of this label for essential product performance information and the following "NON-CROP" sections for specific uses.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OR SPRAY WITH FOLIAGE, GREEN STEMS, EXPOSED NON-WOODY ROOTS OR FRUIT OF CROPS, DESIRABLE TURFGRASSES, TREES, SHRUBS OR OTHER DESIRABLE VEGETATION SINCE SEVERE DAMAGE OR DESTRUCTION MAY RESULT.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seeds. Where repeat applications are necessary, do not exceed 8 quarts of this product per acre per year.

This product does not provide residual weed control. For subsequent weed control, follow a label-approved herbicide program.

Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

INDUSTRIAL, RECREATIONAL AND PUBLIC AREAS

When applied as directed for "NON-CROP USES", under conditions described, this product may be used to control the listed weeds.

Non-Crop Sites - This product may be used to control the listed weeds in terrestrial noncrop sites and/or in aquatic sites within these areas:

airfields; airports; alleys, lanes, trails & access roads; around commercial or industrial structures or outbuildings; around farm and ranch structures and outbuildings; around ornamental gardens; around ornamental trees & shrubs; bare ground; beaches; campgrounds; construction sites; ditch banks; drive-in theaters; driveways & ramps; dry ditches & canals; fences & fencerows; firebreaks; golf courses; gravel yards; habitat restoration & management areas; highways & roadsides (including aprons, medians, guardrails & right of ways); industrial plant sites; industrial areas; lumber yards; mulched areas; natural areas; paths and trails; parking areas; parks; paved areas; petroleum & other tank farms; pumping installations; pipeline, power, telephone & utility rights-of-way; power stations; preplant to turf & ornamental plants; railroad rights-of way; recreation areas; refineries; resorts; schools; sidewalks; sports areas; storage areas; substations; tennis courts; uncropped farmstead areas; uncultivated non-agricultural areas; vacant lots; walkways; wastelands; & wildlife habitat areas

When applied as directed for "NON-CROP USES", under conditions described, this product may be used to control the listed weeds in terrestrial non-crop sites within these areas: Habitat Restoration & Management Area, Pipeline, Power, Telephone & Utility Rights-of-Way and Pumping Installations.

This product is a non-selective herbicide that is diluted and applied to the foliage of actively growing weeds as a spot or broadcast application. It is absorbed by the leaves and moves throughout the stem and roots to control the entire plant. Visible symptoms may require a week or more to appear, with burndown usually occurring in 2 to 4 weeks. Symptoms are a gradual wilting and yellowing of the sprayed plant followed by deterioration of both shoots and roots. This product has no herbicide activity in the soil and will not wash or leach to affect nearby vegetation. Any ornamental species may be planted in treated areas 7 days or more after application. For most effective results, delay mowing, clipping, planting or sodding of treated areas for at least 7 days after application. This allows time for this product to move within the plant.

For specific rates of application and instructions for control of particular annual weeds, perennial weeds, woody brush and trees, see the "WEEDS CONTROLLED" section of this label. These applications may be made to large affected areas or as spot treatments. For general use in small areas, see alternative instructions below under "Small Area Treatment With Hand-held Sprayers".

Unless the "Agriculture Use Requirements" on this label are observed, the following restrictions apply:

Not for use on plants being grown for sale or other commercial use, or for commercial seed production, or for research purposes. For use on plants intended for aesthetic purposes or climactic modification and being grown in ornamental gardens or parks, or on golf courses or lawns and grounds.

AVOID SPRAY DRIFT CONTACT WITH DESIRABLE LAWN GRASSES, FLOWERS, VEGETABLES, SHRUBS OR TREES. DO NOT CONTACT GREEN BARK OF TREES OR SHRUBS. IF DESIRABLE VEGETATION IS CONTACTED, WASH IMMEDIATELY WITH WATER.

Depending on the type of non-crop application, this product may be applied with boom equipment, high-volume spray equipment and hand-held sprayers as described in the respective portions of the "APPLICATION EQUIPMENT and TECHNIQUES" section of the label. Additionally, the product may be applied with recirculating sprayers, shielded applicators, or wiper applicators in any non-crop site specified on this label. See the "Selective Equipment" part of "APPLICATION EQUIPMENT AND TECHNIQUES" section of this label for information on proper use and calibration of this equipment.

Small Area Treatment With Hand-held Sprayers

Add 2.25 to 4.5 fluid ounces of this product plus 0.5 to 1 fluid ounce of nonionic surfactant to 1 gallon of clean water. Use the low rate for many grasses and annual weeds. Use the higher specified rate for control of perennials and brush. Use pump-up sprayer, backpack sprayer or other sprayer suitable for small areas. Adjust equipment to deliver a coarse spray pattern. USE OF HOSE-END SPRAYERS OR SPRINKLER-TYPE DEVICES MAY NOT BE USED.

TANK MIXTURES FOR NON-CROP SITES

When applied as a tank mixture, this product provides control of the emerged annual weeds and partial control of the emerged perennial weeds listed in this label. When applied as a tank mixture, the following residual herbicides will provide preemergence control of the weeds listed in the individual product labels.

This product PLUS Diuron
This product PLUS Krovar® I
This product PLUS Princep®, Caliber®90, Simazine 4L, 80W or 90DF
This product PLUS Surflan®75W, Surflan AS
This product PLUS Ronstar®50WP
This product PLUS Spyder or Spyder Extra
This product PLUS ProClipse
This product PLUS Polaris AC Complete

When tank mixing with residual herbicides, add a nonionic surfactant at 0.5 to 1 percent by volume of spray solution. See the "APPLICATION EQUIPMENT AND TECHNIQUES" section of this label before preparing these tank mixtures.

Read and carefully observe the label claims, precautionary statements, specified use rate and all other information on the labels of all products used in these tank mixtures.

Use according to the most restrictive label directions for each product in the mixture.

CONTROL OF EMERGED WEEDS

Note: For backpack sprayer and handgun applications, see the "HAND-HELD AND HIGH VOLUME EQUIPMENT" section for specified rates.

Annual Weeds

Apply 1.5 pints per acre of this product in these tank mixtures when weeds are less than 6 inches tall and 2.25 pints per acre when weeds are more than 6 inches tall.

Perennial Weeds

For partial control of perennial weeds using these tank mixtures, apply 1.5 to 7.5 pints per acre of this product. Follow these recommendations in the "WEEDS CONTROLLED" section of this label for stage of growth and rate of application for specific perennial weeds.

PREEMERGENCE WEED CONTROL

For preemergence weed control, refer to the individual product labels for specific non-crop sites, rates, carrier volumes and precautionary statements.

Mix only the quantity of spray solution which can be used during the same day. Do not allow these tank mixtures to stand overnight as this may result in reduced weed control.

BROADCAST APPLICATION FOR WEED CONTROL IN CHRISTMAS TREE PLANTATIONS

NOTE: IF THIS PRODUCT IS IMPROPERLY APPLIED, IT HAS THE POTENTIAL TO CAUSE SEVERE INJURY TO CHRISTMAS TREES. FOLLOW ALL LABELED DIRECTIONS.

This product may be applied as a broadcast spray over established Christmas trees. To prevent drift onto nearby desirable crops or vegetation, ensure that adequate buffers are maintained.

The following Christmas tree species are approved for this application:

- Douglas Fir (*Pseudotsuga menziesii*)
- Fir species (*Abies* spp.)
- Spruce species (*Picea* spp.)

Do not apply this product until trees have completed at least a full growing season since planting or transplanting. Do not apply within 1 full year prior to tree harvest.

In the fall, applications may only be made after the formation of final conifer resting buds. Final resting buds must be in the dormant stage and fully hardened. If applications are made at any other time, unacceptable Christmas tree injury may occur.

Avoid spray pattern overlap, as injury may result.

Apply 24 fluid ounces of this product per acre in 5 to 30 gallons of water per acre.

NOTE: ADDING SURFACTANTS, ADDITIVES CONTAINING SURFACTANTS, OR ANY OTHER ADDITIVES TO THIS PRODUCT MAY RESULT IN SEVERE CHRISTMAS TREE INJURY.

In some areas, this product may be used at rates from 24 to 48 fluid ounces per acre. Consult your local Nufarm representative for specific instructions if you require rates that exceed 24 fluid ounces per acre.

Do not use drift control additives as they may increase Christmas tree injury. Do not use other herbicides in a tank mix with this product as Christmas trees could be severely injured.

SILVICULTURAL SITES AND RIGHTS-OF-WAY

NOTE: DO NOT USE AS AN OVER-THE-TOP BROADCAST SPRAY IN SILVICULTURAL NURSERIES.

When applied as directed for "NON-CROP USES" under conditions described this product controls undesirable vegetation listed on this label. This product also suppresses or controls undesirable vegetation listed on this label when applied at specified rates for release of established coniferous species listed on this label.

For specific rates of application and instructions for control of various brush, annual and perennial weeds, see the "WEEDS CONTROLLED" section of this label. For specific rates of application for release of listed coniferous species, see the "CONIFER RELEASE" part of this section of the label.

Where repeat applications are necessary, do not exceed 8 quarts of this product per acre per year.

Aerial Application

This product may be applied using aerial spray equipment for silvicultural site preparation, conifer release and rights-of-way treatments. See the "APPLICATION EQUIPMENT and TECHNIQUES" part of the "MIXING AND APPLICATION INSTRUCTIONS APPLICATION EQUIPMENT AND TECHNIQUES" section of this label for information on how to apply this product by air. DO NOT APPLY THIS PRODUCT BY AIR TO RIGHTS-OF-WAY SITES IN THE STATE OF CALIFORNIA.

SITE PREPARATION

Following preplant applications of this product, any silvicultural species may be planted.

POST DIRECTED SPRAY

In established silvicultural sites, use as a spray on the foliage of undesirable vegetation. Care must be exercised to avoid contact of spray, drift or mist with foliage or green bark of desirable species.

CONIFER RELEASE

For release, apply at the end of the first growing season, except in California. Vegetation of target weeds or trees should not be disturbed prior to treatment or until visual symptoms appear after treatment. Symptoms of treatment are slow to appear, especially in woody species treated in late Fall. **Injury may occur to conifers treated for release, especially where spray patterns overlap or the higher rates are applied or when applications are made during periods of active conifer growth.**

Applications must be made after formation of final conifer resting buds in the fall or prior to initial bud swelling in spring. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Use the following rates for conifer release to control or partially control the weeds listed in the "WEEDS CONTROLLED" section of this label.

For release of the following conifer species:

Douglas Fir <i>Pseudotsuga menziesii</i>	Fir <i>Abies</i> spp.	Hemlock <i>Tsuga</i> spp.	Pines* <i>Pinus</i> spp.	Spruce <i>Picea</i> spp.
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*Includes all species except eastern white pine, loblolly pine or slash pine.

Apply 2.25 to 3 pints of this product per acre except in Washington and Oregon, west of the crest of the Cascade Mountains. For Spring treatments west of the crest of the Cascade Mountains, apply 1 quart of this product per acre before conifer bud swell for control of annual weeds. For Fall treatments in Washington and Oregon, west of the crest of the Cascade Mountains, apply 1.5 to 2.25 pints of this product per acre before any major leaf drop of deciduous species. Add 10 fluid ounces nonionic surfactant per 2 pints of this product. In Maine, up to 4.5 pints per acre may be used for the control of difficult weeds.

Note for Douglas fir release: Ensure that surfactant has been adequately tested for Douglas fir safety and follow manufacturer's specifications for rate of application.

For release of Western hemlock, apply 1 quart of this product per acre.

For release of the following conifer species:

Loblolly Pine <i>Pinus taeda</i>	Eastern white pine <i>Pinus strobus</i>	Slash pine <i>Pinus elliottii</i>
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Late Season Application - Apply 2-1/4 to 3 pints of this product in a minimum of 5 gallons of spray solution per acre during early autumn. Nufarm does not recommend the use of a crop oil concentrate or MSO (methylated seed oil) based surfactant for use in southern conifer species release with this product. The addition of a tested and approved southern conifer release surfactant is recommended. Applications made prior to September 1 or when conditions are conducive to rapid growth of conifers will create the potential for increased injury in the form of tip and/or needle burn. Injury may decrease with later applications. Some autumn colors are acceptable at time of application. Apply prior to frost or leaf drop of undesirable plants.

Applications made according to label directions will release loblolly pine, eastern white pine and slash pine by reducing competition from the following species:

Ash <i>Fraxinus</i> spp.	Hawthorn <i>Crataegus</i> spp.	Oak, Post <i>Quercus stellata</i>	Poplar, yellow <i>Liriodendron tulipifera</i>	Sumac, Smooth <i>Rhus glabra</i>
Cherry, Black <i>Prunus serotina</i>	Locust, Black <i>Robinia pseudoacacia</i>	Oak, Southern Red <i>Quercus falcata</i>	Sassafras <i>Sassafras albidum</i>	Sumac, Winged <i>Rhus copallina</i>
Cherry, Pin <i>Prunus pensylvanica</i>	Maple, Red <i>Acer rubra</i>	Oak, White <i>Quercus alba</i>	Sourwood <i>Oxydendrum arboreum</i>	Sweetgum <i>Liquidambar styraciflua</i>
Elm <i>Ulmus</i> spp.	Oak, Black <i>Quercus velutina</i>	Persimmon <i>Diospyros</i> spp.	Sumac, Poison <i>Rhus vernix</i>	

Apply only to those sites where woody brush and trees listed in this label constitute the majority of the undesirable species.

THIS PRODUCT PLUS SPYDER TANK MIXTURES FOR CONIFER RELEASE FROM HERBACEOUS WEEDS

To release Loblolly pines, Slash, Red pine and Virginia pine from herbaceous weeds, tank mixtures of this product with Spyder will provide control of annual weeds listed in the "WEEDS CONTROLLED" section of this and the Spyder label, and partial control of the perennial weeds listed below .

Apply 12 to 18 fluid ounces of this product plus 2 to 4 fluid ounces of Spyder in 10 to 30 gallons of spray solution per acre. Nufarm does not recommend the use of a crop oil concentrate or MSO (methylated seed oil) based surfactant for use in southern conifer species release with this product. The addition of a tested and approved southern conifer release surfactant is recommended. Make application to actively growing weeds as a broadcast spray over the top of the young Loblolly pine, Red pine, Slash pine and Virginia pine.

This tank mixture may be applied using aerial equipment. When applying by air, use the specified rate in 5 to 15 gallons of spray solution per acre. This product plus Spyder tank mixtures may not be applied by air in California.

For control of annual weeds below 12 inches in height (or runner length on annual vines), use the lower rates of both products.

Use the higher rates of both products when annual weeds are in more advanced stages of growth and approaching flower or seed formation.

Use the higher rates of both products for partial control of the following perennial weeds. Use the lower rates for suppression of growth.

Bahiagrass <i>Paspalum notatum</i>	Dock, curly <i>Rumex crispus</i>	Fescues, tall <i>Festuca arundinacea</i>	Poorjoe* <i>Diodia teres</i>	Vaseygrass <i>Paspalum urvillei</i>
Broomsedge <i>Andropogon virginicus</i>	Dogfennel <i>Eupatorium capilliflorum</i>	Johnsongrass* <i>Sorghum halepense</i>	Trumpet creeper** <i>Campsis radicans</i>	Vervain, blue <i>Verbena hastata</i>

*Control at the higher rates

**Suppression at the higher rates only.

Pine damage may occur or can be accentuated if treatment takes place when young trees are under stress from drought, flood water, insects or disease, or are in an active growth stage.

Read and observe the cautionary statements and all other information appearing on the labels of all herbicides used.

Note To User: This product must not be used in areas where adverse impact on federally designated endangered/threatened plant or aquatic species is likely. Prior to making applications, the user of this product must determine that no such species are located in or immediately adjacent to the area to be treated.

WIPER APPLICATIONS

For wick or wiper applications, mix 1 gallon of this product with 2 gallons of clean water to make a 33 percent solution. Addition of a nonionic surfactant at a rate of 10 percent by volume of total herbicide solution is recommended.

Wiper applications can be used to control or suppress annual and perennial weeds listed on this label. In heavy weed stands, a double application in opposite directions may improve results. See the "WEEDS CONTROLLED" section in this label for specified timing, growth stage and other instructions for achieving optimum results.

CUT STUMP APPLICATION

Woody vegetation may be controlled by treating freshly cut stumps of trees and resprouts with this product. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut vegetation close to the soil surface. **Apply a 50 to 100 percent solution of this product to the freshly-cut surface immediately after cutting.** Delay in application may result in reduced performance. For best results, applications should be made during periods of active growth and full leaf expansion.

When used according to directions for cut stump application, this product will control, partially control or suppress many types of woody brush and tree species, some of which are listed below:

Alder <i>Alnus</i> spp.	Eucalyptus <i>Eucalyptus</i> spp.	Maple <i>Acer</i> spp.	Reed, Giant <i>Arundo donax</i>	Sycamore <i>Platanus occidentalis</i>
Coyote Brush <i>Baccharis consanguinea</i>	Hickory <i>Carya</i> spp.	Oak <i>Quercus</i> spp.	Salt cedar <i>Tamarix</i> spp.	Tan Oak <i>Lithocarpus densiflorus</i>
Dogwood <i>Cornus</i> spp.	Madrone <i>Arbutus menziesii</i>	Poplar <i>Populus</i> spp.	Sweet gum <i>Liquidambar styraciflua</i>	Willow <i>Salix</i> spp.

INJECTION AND FRILL APPLICATIONS

Woody vegetation may be controlled by injection or frill application of this product. Apply this product using suitable equipment which must penetrate into the living tissue. Apply the equivalent of 1 ml of this product per each 2 to 3 inches of trunk diameter (DBH). This is best achieved by applying a 25 to 100 percent concentration of this product either to a continuous frill around the tree or as cuts evenly spaced around the tree below all branches. As tree diameter increases in size, better results are achieved by applying diluted material to a continuous frill or more closely spaced cuttings. Avoid application techniques that allow runoff to occur from frill or cut areas in species that exude sap freely after frills or cutting. In species such as these, make frill or cut at an oblique angle so as to produce a cupping effect and use undiluted material. For best results, applications should be made during periods of active growth and after full leaf expansion.

Control		Suppression	
Oak	<i>Quercus</i> spp.	Black Gum	<i>Nyssa sylvatica</i>
Poplar	<i>Populus</i> spp.	Dogwood	<i>Cornus</i> spp.
Sweetgum	<i>Liquidambar styraciflua</i>	Hickory	<i>Carya</i> spp.
Sycamore	<i>Platanus occidentalis</i>	Maple, Red	<i>Acer rubrum</i>

WETLAND SITES

This product may be used in and around water (aquatic areas) and wetlands found in forestry and in power, telephone and pipeline rights-of-way sites including where these sites are adjacent to or surrounding domestic water supply reservoirs, supply streams, lakes and ponds. Read and observe the following before making applications in and around water.

Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat in such areas.

There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.

Note: Do not apply this product directly to water within 0.5 mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 0.5 mile of an active potable water intake in a standing body of water such as a lake, pond or reservoir. To make aquatic applications around and within 0.5 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after application. These aquatic applications may be made ONLY in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the application. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.

Do not spray open bodies of water where woody brush, trees and herbaceous weeds do not exist. The maximum application rate of 3.75 quarts per acre must not be exceeded in a single over-water broadcast application except as follows, where any specified rate may be applied:

- Stream crossings in utility right-of-way.
- Where applications will result in less than 20 percent of the total water area being treated.

WILDLIFE HABITAT RESTORATION AND MANAGEMENT AREAS

This product is for the restoration and/or maintenance of native habitat and in wildlife management areas.

Habitat Restoration and Maintenance

When applied as directed, exotic and other undesirable vegetation may be controlled in habitat management areas. Applications may be made to allow recovery of native plant species, to open up water to attract waterfowl, and for similar broad-spectrum vegetation control requirements in habitat management areas. Spot treatments may be made to selectively remove unwanted plants for habitat enhancement. For spot treatments, care should be exercised to keep spray off of desirable plants.

Wildlife Food Plots

This product may be used as site preparation treatment prior to planting wildlife food plots. Apply as directed to control vegetation in the plot area. Any wildlife food species may be planted after applying this product, or native species may be allowed to re-infest the area. If tillage is needed to prepare a seedbed, wait 7 days after applying this product before tilling to allow for maximum effectiveness.

WIPER APPLICATIONS

For wick or wiper applications, mix 1 gallon of this product with 2 gallons of clean water to make a 33 percent solution. Addition of a nonionic surfactant at a rate of 10 percent by volume of total herbicide solution is recommended.

Wiper applications can be used to control or suppress annual and perennial weeds listed on this label. In heavy weed stands, a double application in opposite directions may improve results. See the "WEEDS CONTROLLED" section in this label for specified timing, growth stage and other instructions for achieving optimum results.

CUT STUMP APPLICATION

Woody vegetation may be controlled by treating freshly cut stumps of trees and resprouts with this product. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut vegetation close to the soil surface. **Apply a 50 to 100 percent solution of this product to the freshly-cut surface immediately after cutting.** Delay in application may result in reduced performance. For best results, applications should be made during periods of active growth and full leaf expansion.

When used according to directions for cut stump application, this product will control, partially control or suppress many types of woody brush and tree species, some of which are listed below:

Alder <i>Alnus</i> spp.	Eucalyptus <i>Eucalyptus</i> spp.	Maple <i>Acer</i> spp.	<i>Populus</i> spp. Reed, Giant <i>Arundo donax</i>	Sweet gum <i>Liquidambar styraciflua</i>
Coyote Brush <i>Baccharis consanguinea</i>	Hickory <i>Carya</i> spp.	Oak <i>Quercus</i> spp.	Salt cedar <i>Tamarix</i> spp.	Sycamore <i>Platanus occidentalis</i>
Dogwood <i>Cornus</i> spp.	Madrone <i>Arbutus menziestii</i>	Poplar		Tan Oak <i>Lithocarpus densiflorus</i>

INJECTION AND FRILL APPLICATIONS

Woody vegetation may be controlled by injection or frill application of this product. Apply this product using suitable equipment which must penetrate into living tissue. Apply the equivalent of 1 ml of this product per 2 to 3 inches of trunk diameter. This is best achieved by applying 25 to 100 percent concentration of this product either to a continuous frill around the tree or as cuts evenly spaced around the tree below all branches. As tree diameter increases in size, better results are achieved by applying dilute material to a continuous frill or more closely spaced cuttings. Avoid application techniques that allow runoff to occur from frill or cut areas in species that exude sap freely after frills or cutting. In species such as these, make frill or cut at an oblique angle so as to produce a cupping effect and use undiluted material. For best results, applications should be made during periods of active growth and full leaf expansion.

Control		Suppression	
Oak	<i>Quercus</i> spp.	Black Gum*	<i>Nyssa sylvatica</i>
Poplar	<i>Populus</i> spp.	Dogwood	<i>Cornus</i> spp.
Sweetgum	<i>Liquidambar styraciflua</i>	Hickory	<i>Carya</i> spp.
Sycamore	<i>Platanus occidentalis</i>	Maple, Red	<i>Acer rubrum</i>

*This product is not approved for this use on this species in the state of California.

INJECTION METHOD FOR CONTROL OF JAPANESE KNOTWEED (*Polygonum cuspidatum*) & GIANT KNOTWEED (*Polygonum polystachyum*)

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

This label must be in the possession of the user at the time of application.

All applicable directions and precautions in the AquaNeat Herbicide label booklet must be followed.

See the "PRODUCT INFORMATION" and "MIXING AND APPLICATION INSTRUCTIONS" sections of this product's label booklet for essential product performance information.

This product may be used for control of Japanese knotweed and giant knotweed using individual stem treatment. Individual knotweed stems may be treated by injecting up to 5 ml of undiluted this product directly into the hollow stem just below a node. A hole suitable for injecting the herbicide should be made through both sides of the stem using an awl or other convenient pointed tool about 6 inches above the ground, just below a node. (Nodes are circular thickenings or scars surrounding the stem where leaves are or were previously attached.) The herbicide is then injected into this hole. Each stem of the knotweed plant must be treated.

This product can be injected using any injection device capable of delivering a 5 ml dose. For convenience and accuracy, a hand-operated injection device designed to deliver repeated pre-measured doses from a supply reservoir is recommended.

Commercially available dose measuring equipment may be adapted for this purpose. Calibrate the device to deliver a dose of 5 ml per injection cycle. A sharpened hollow probe for puncturing the stem and delivery of the herbicide can also be integrated into the delivery system.

Restriction: Do not apply more than 7.5 quarts of this product per acre. At 5 ml per stem, 7.5 quarts is sufficient to treat a maximum of 1,420 stems per acre.

**RELEASE OF BERMUDAGRASS OR BAHIAGRASS ON NONCROP SITES
RELEASE OF DORMANT BERMUDAGRASS AND BAHIAGRASS**

When applied as directed, this product will provide control or suppression of many winter annual weeds and tall fescue for effective release of dormant bermudagrass or bahiagrass. Make applications to dormant bermudagrass or bahiagrass.

For best results on winter annuals, treat when weeds are in an early growth stage (below 6 inches in height) after most have germinated. For best results on tall fescue, treat when fescue is in or beyond the 4- to 6-leaf stage.

WEEDS CONTROLLED

Rate for control or suppression of winter annuals and tall fescue are listed below.

Apply the specified rates of this product in 10 to 25 gallons of water per acre, plus 2 quarts nonionic surfactant per 100 gallons of total spray volume.

WEEDS CONTROLLED OR SUPPRESSED*

**NOTE: C = Control
S = Suppression**

WEED SPECIES	AQUANEAT AQUATIC HERBICIDE (FLUID OZ/ACRE)					
	6	9	12	18	24	48
Barley, little <i>Hordeum pusillum</i>	S	C	C	C	C	C
Bedstraw, catchweed <i>Galium aparine</i>	S	C	C	C	C	C
Bluegrass, annual <i>Poa annual</i>	S	C	C	C	C	C
Chervil <i>Chaerophyllum tainturieri</i>	S	C	C	C	C	C
Chickweed, common <i>Stellaria media</i>	S	C	C	C	C	C
Clover, crimson <i>Trifolium incarnatum</i>	.	S	S	C	C	C
Clover, large hop <i>Trifolium campestre</i>	.	S	S	C	C	C
Speedwell, corn <i>Veronica arvensis</i>	S	C	C	C	C	C
Fescue, tall <i>Festuca arundinacea</i>	S	S
Geranium, Carolina <i>Geranium carolinianum</i>	.	.	S	S	C	C
Henbit <i>Lamium amplexicaule</i>	.	S	C	C	C	C
Ryegrass, Italian <i>Lolium multiflorum</i>	.	.	S	C	C	C
Vetch, common <i>Vicia sativa</i>	.	.	S	C	C	C

*These rates apply only to sites where an established competitive turf is present.

RELEASE OF ACTIVELY GROWING BERMUDAGRASS

NOTE: USE ONLY ON SITES WHERE BAHIAGRASS OR BERMUDAGRASS ARE DESIRED FOR GROUND COVER AND SOME TEMPORARY INJURY OR YELLOWING OF THE GRASSES CAN BE TOLERATED.

When applied as directed, this product will aid in the release of bermudagrass by providing control of annual species listed in the "WEEDS CONTROLLED" section in this label, and suppression or partial control of certain perennial weeds.

For control or suppression of those annual species listed in this label, use 3/4 to 2-1/4 pints of this product as a broadcast spray in 10 to 25 gallons of spray solution per acre, plus 2 quarts of a nonionic surfactant per 100 gallons of total spray volume. Use the lower rate when treating annual weeds below 6 inches in height (or length of runner in annual vines). Use the higher rate as size of plants increases or as they approach flower or seedhead formation.

Use the higher rate for partial control or longer-term suppression of the following perennial species. Use lower rates for shorter-term suppression of growth.

- Bahiagrass Johnsongrass**
- Dallisgrass Trumpetcreeper*
- Fescue (tall) Vaseygrass

*Suppression at the higher rate only.

**Johnsongrass is controlled at the higher rate.

Use only on well-established bermudagrass. Bermudagrass injury may result from the treatment but regrowth will occur under moist conditions. Repeat applications in the same season are not recommended, since severe injury may result.

BAHIAGRASS SEEDHEAD AND VEGETATIVE SUPPRESSION

When applied as directed in the "NONCROP SITES" section in this label, this product will provide significant inhibition of seedhead emergence and will suppress vegetative growth for a period of approximately 45 days with single applications and approximately 120 days with sequential applications.

Apply this product 1 to 2 weeks after full green-up of bahiagrass or after the bahiagrass has been mowed to a uniform height of 3 to 4 inches. Applications must be made prior to seedhead emergence. Apply 5 fluid ounces per acre of this product, plus 2 quarts of an approved nonionic surfactant per 100 gallons of total spray volume in 10 to 25 gallons of water per acre.

Sequential applications of this product plus nonionic surfactant may be made at approximately 45-day intervals to extend the period of seedhead and vegetative growth suppression. For continued vegetative growth suppression, sequential applications must be made prior to seedhead emergence.

Apply no more than 2 sequential applications per year. As a first sequential application, apply 3 fluid ounces of this product per acre plus nonionic surfactant. A second sequential application of 2 to 3 fluid ounces per acre plus nonionic surfactant may be made approximately 45 days after the last application.

ANNUAL GRASS GROWTH SUPPRESSION

For growth suppression of some annual grasses, such as annual ryegrass, wild barley and wild oats growing in coarse turf on roadsides or other industrial areas, apply 3 to 4 ounces of this product in 10 to 40 gallons of spray solution per acre. Mix 2 quarts of a nonionic surfactant per 100 gallons of spray solution. Applications should be made when annual grasses are actively growing and before the seedheads are in the boot stage of development. Treatments made after seedhead emergence may cause injury to the desired grasses.

AQUATIC SITES

When applied as directed and under the conditions described in the "WEEDS CONTROLLED" section in this label, this product will control or partially control the labeled weeds growing in aquatic sites.

Aquatic Sites - This product may be applied to emerged weeds in all bodies of fresh and brackish water which may be flowing, non-flowing or transient. This includes lakes, rivers, streams, ponds, estuaries, rice levees, seeps, irrigation and drainage ditches, canals, reservoirs, wastewater treatment facilities, wildlife habitat restoration and management areas, and similar sites.

If aquatic sites are present in the noncrop area and are part of the intended treatment, read and observe the following directions:

This product does not control plants which are completely submerged or have a majority of their foliage under water.

There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.

Consult local state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.

NOTE: Do not apply this product directly to water within 1/2 mile up-stream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as lake, pond or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after the application. The water intake may be turned on prior to 48 hours if the glyphosate level in the intake water is below 0.7 parts per million as determined by laboratory analysis. These aquatic applications may be made ONLY in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the applications. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.

For treatments after drawdown of water or in dry ditches, allow 7 or more days after treatment before reintroduction of water to achieve maximum weed control. Apply this product within 1 day after drawdown to ensure application to actively growing weeds. Floating Mats of vegetation may require retreatment. Avoid wash-off of sprayed foliage by spray boat or recreational boat backwash or by rainfall within 6 hours of application. Do not re-treat within 24 hours following the initial treatment.

Applications made to moving bodies of water must be made while traveling upstream to prevent concentration of this herbicide in water. When making any bankside applications, do not overlap more than 1 foot into open water. Do not spray in bodies of water where weeds do not exist. The maximum application rate of 7-1/2 pints per acre must not be exceeded in any single broadcast application that is being made over water.

When emerged infestations require treatment of the total surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in fish kill.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

PESTICIDE STORAGE: Do not store below 32°F or above 100°F. Store in original container in a well-ventilated area separately from fertilizer, feed, and food stuffs. Avoid cross-contamination with other pesticides.

PESTICIDE DISPOSAL: Pesticide wastes are toxic. Wastes resulting from this product may be disposed of on site or at an approved waste disposal facility. Improper disposal of excess pesticide, spray mix, or rinsate is a violation of federal law. If these wastes cannot be disposed of according to label instructions, contact the state agency responsible for pesticide regulation or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL [HANDLING]:

[**Note to Reviewer:** The following statement will be included on all Final Printed Labels bearing multiple Container Disposal (Container Handling) statements] **NOTE:** This product is available in multiple containers. Refer to the Net Contents section of this products labeling for the applicable “Nonrefillable” or “Refillable” designation. Follow the container disposal [handling] instructions below that apply to your container type / size. [**Note to Reviewer:** The bracketed section headers will be included when multiple container types / sizes are listed on the label.]

[Nonrefillable Containers 5 Gallons or Less:] Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. **Triple rinse as follows:** Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by State and local authorities. Plastic containers are also disposable by incineration, or, if allowed by State and local authorities, by burning. If burned stay out of smoke

[Nonrefillable containers larger than 5 gallons:] Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse as follows:** Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse as follows:** Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

[Refillable containers larger than 5 gallons:] Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

[Refillable containers larger than 5 gallons:] Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

WARRANTY DISCLAIMER

The directions for use of this product must be followed carefully. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, (1) THE GOODS DELIVERED TO YOU ARE FURNISHED "AS IS" BY MANUFACTURER OR SELLER AND (2) MANUFACTURER AND SELLER MAKE NO WARRANTIES, GUARANTEES, OR REPRESENTATIONS OF ANY KIND TO BUYER OR USER, EITHER EXPRESS OR IMPLIED, OR BY USAGE OF TRADE, STATUTORY OR OTHERWISE, WITH REGARD TO THE PRODUCT SOLD, INCLUDING, BUT NOT LIMITED TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, USE, OR ELIGIBILITY OF THE PRODUCT FOR ANY PARTICULAR TRADE USAGE. UNINTENDED CONSEQUENCES, INCLUDING BUT NOT LIMITED TO INEFFECTIVENESS, MAY RESULT BECAUSE OF SUCH FACTORS AS THE PRESENCE OR ABSENCE OF OTHER MATERIALS USED IN COMBINATION WITH THE GOODS, OR THE MANNER OF USE OR APPLICATION, INCLUDING WEATHER, ALL OF WHICH ARE BEYOND THE CONTROL OF MANUFACTURER OR SELLER AND ASSUMED BY BUYER OR USER. THIS WRITING CONTAINS ALL OF THE REPRESENTATIONS AND AGREEMENTS BETWEEN BUYER, MANUFACTURER AND SELLER, AND NO PERSON OR AGENT OF MANUFACTURER OR SELLER HAS ANY AUTHORITY TO MAKE ANY REPRESENTATION OR WARRANTY OR AGREEMENT RELATING IN ANY WAY TO THESE GOODS.

LIMITATION OF LIABILITY

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, IN NO EVENT SHALL MANUFACTURER OR SELLER BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR FOR DAMAGES IN THEIR NATURE OF PENALTIES RELATING TO THE GOODS SOLD, INCLUDING USE, APPLICATION, HANDLING, AND DISPOSAL. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, MANUFACTURER OR SELLER SHALL NOT BE LIABLE TO BUYER OR USER BY WAY OF INDEMNIFICATION TO BUYER OR TO CUSTOMERS OF BUYER, IF ANY, OR FOR ANY DAMAGES OR SUMS OF MONEY, CLAIMS OR DEMANDS WHATSOEVER, RESULTING FROM OR BY REASON OF, OR ARISING OUT OF THE MISUSE, OR FAILURE TO FOLLOW LABEL WARNINGS OR INSTRUCTIONS FOR USE, OF THE GOODS SOLD BY MANUFACTURER OR SELLER TO BUYER. ALL SUCH RISKS SHALL BE ASSUMED BY THE BUYER, USER, OR ITS CUSTOMERS. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BUYER'S OR USER'S EXCLUSIVE REMEDY, AND MANUFACTURER'S OR SELLER'S TOTAL LIABILITY SHALL BE FOR DAMAGES NOT EXCEEDING THE COST OF THE PRODUCT.

If you do not agree with or do not accept any of directions for use, the warranty disclaimers, or limitations on liability, do not use the product, and return it unopened to the Seller, and the purchase price will be refunded.

(RV121211)

AquaNeat is a registered trademark of Nufarm, Inc.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: AquaNeat® Aquatic Herbicide
EPA Reg. No.: 228-365
Synonyms: Isopropylamine Salt of Glyphosate; Glyphosate IPA Salt
Product Type: Herbicide

Company Name: Nufarm Americas Inc.
11901 Austin Avenue
Alsip, IL 60803

Telephone Numbers: 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

Date of Issue: October 8, 2013 **Supersedes:** February 7, 2012
Sections Revised: 1

2. HAZARDS IDENTIFICATION**Emergency Overview:**

Appearance and Odor: Colorless viscous solution with little odor.

Warning Statements: Keep out of reach of children. CAUTION. Harmful if inhaled. Avoid breathing spray mist.

Potential Health Effects:

Likely Routes of Exposure: Skin contact and inhalation.

Eye Contact: Slightly irritating based on toxicity studies.

Skin Contact: Slightly toxic and slightly irritating based on toxicity studies.

Ingestion: 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: Low inhalation toxicity.

Medical Conditions Aggravated by Exposure: None known

See Section 11: TOXICOLOGICAL INFORMATION for more information.

Potential Environmental Effects:

For aquatic uses, do not contaminate water when disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

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	53.8
Other Ingredients		46.2

4. FIRST AID MEASURES

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 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 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: In case of fire, use water (flood with water), dry chemical, CO₂, 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): May produce gases such as oxides of carbon, nitrogen, and phosphorous.

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. Thoroughly scrub floor or other impervious surface with a strong industrial detergent and rinse with water. 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:

Harmful if inhaled. Avoid breathing spray mist. Remove contaminated clothing and wash clothing before reuse. Wash thoroughly with soap and water after handling.

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 store below 32° F or above 100° F. Store in original container in a well-ventilated area separately from fertilizer, feed, and footstuffs. Avoid cross-contamination with other pesticides. 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: 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: 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	

NE = Not Established

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Colorless viscous solution with little odor.

Boiling Point:	Not determined	Solubility in Water:	Miscible
Density:	10.00 pounds/gallon	Specific Gravity:	1.201 @ 20°C
Evaporation Rate:	Not determined	Vapor Density:	Not determined
Freezing Point:	10°F (-12°C)	Vapor Pressure:	Not determined
pH:	5.0 - 5.4	Viscosity:	67.9 cPs @ 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 carbon, nitrogen, and phosphorous.

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 LD₅₀: >5,000 mg/kg

Dermal: Rabbit LD₅₀: >5,000 mg/kg

Inhalation: Rat 4-hr LC₅₀: >4.24 mg/l

Eye Irritation: Rabbit: Minimally irritating

Skin Irritation: Rabbit: Non-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.

Carcinogenicity / Chronic Health Effects: Prolonged overexposure to glyphosate may cause effects to the liver. There was no evidence of carcinogenicity in animal studies using glyphosate. EPA has given glyphosate 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.

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.

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

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 ₅₀ Bluegill:	120 mg/l	Bobwhite Quail 8-day Dietary LC ₅₀ :	>4,500 ppm
96-hour LC ₅₀ Rainbow Trout:	86 mg/l	Mallard Duck 8-day Dietary LC ₅₀ :	>4,500 ppm
48-hour LC ₅₀ Daphnia:	780 mg/l	Bee LD ₅₀ (oral and contact)	>100 ug/bee
Green alga growth inhibition EC ₅₀	127 mg/ml	Duckweed inhibition EC ₅₀	24.4 mg/ml

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.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Pesticide wastes are toxic. Wastes resulting from this product may be disposed of on site or at an approved waste disposal facility. Improper disposal of excess pesticide, spray mix, or rinsate is a violation of federal law. If these wastes cannot be disposed of according to label instructions, contact the state agency responsible for pesticide regulation or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Handling and Disposal:

Nonrefillable Containers 5 Gallons or Less: Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. **Triple rinse as follows:** Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by State and local authorities. Plastic containers are also disposable by incineration, or, if allowed by State and local authorities, by burning. If burned stay out of smoke.

Nonrefillable containers larger than 5 gallons: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse as follows:** Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse as follows:** Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or

mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable containers larger than 5 gallons: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

Refillable containers larger than 5 gallons: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

14. TRANSPORTATION INFORMATION

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

DOT

Non Regulated

IMDG

Non Regulated

IATA

Non Regulated

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, Nufarm Americas 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 Nufarm Americas Inc. be responsible for damages of any nature whatsoever resulting from the use of or 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.

AquaNeat is a registered trademark of Nufarm Americas Inc.



AQUATHOL® K

AQUATIC HERBICIDE

For aquatic plant control in quiescent, slow moving,
and flowing water aquatic sites.

ACTIVE INGREDIENT:

Dipotassium salt of endothall* 40.3%

OTHER INGREDIENTS: 59.7%

TOTAL 100.0%

Contains 4.23 lbs. dipotassium endothall* per gallon

*7-oxabicyclo [2.2.1]heptane-2,3-dicarboxylic acid equivalent 28.6%

KEEP OUT OF REACH OF CHILDREN DANGER PELIGRO

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.)

FIRST AID

IF IN EYES:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing.
- Call a poison control center or doctor for 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 by a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

IF ON SKIN OR CLOTHING:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 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 ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.
- Call a poison control center or doctor for treatment advice.

HOT LINE NUMBER: Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 866-673-6671 (Rocky Mountain Poison Control Center) for emergency medical treatment information.

See inside for additional precautionary statements.

NOTE TO PHYSICIAN: Measures against circulatory shock, respiratory depression, and convulsion may be needed.

EPA Registration No. 70506-176

Batch/Lot No.: _____

Net Contents: _____



United Phosphorus, Inc.

630 Freedom Business Center, Suite 402

King of Prussia, PA 19406

1-800-438-6071

PRODUCT INFORMATION

Aquathol K is a liquid concentrate soluble in water which is effective against a broad range of aquatic plants. Dosage rates indicated for the application of Aquathol K are measured in parts per million (ppm) of dipotassium endothall.

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS DANGER

CORROSIVE. CAUSES IRREVERSIBLE EYE DAMAGE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING. AVOID BREATHING VAPORS OR SPRAY MIST. PROLONGED OR FREQUENTLY REPEATED SKIN CONTACT MAY CAUSE ALLERGIC REACTIONS IN SOME INDIVIDUALS.

Personal Protective Equipment (PPE)

Mixers, Loaders, Applicators and other handlers must wear:

- Long-sleeved shirt and long pants,
- Shoes and socks,
- Chemical-resistant gloves made of any waterproof material,
- Protective eyewear,
- NIOSH-approved respirator with a dust/mist filter with MSHA/NIOSH approval number prefix TC-21C or any N, R, P, or HE filter.

Exception: During application, the respirator need not be worn, provided that the pesticide is applied in a manner (such as direct metering or subsurface application from the rear of a vessel that is moving into the wind) such that the applicator will have no contact with the pesticide.

See Engineering Controls for additional requirements.

User Safety Requirements:

Follow the manufacturers' instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Discard clothing or other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

Engineering Controls:

When mixers and loaders use a closed system designed by the manufacturer to enclose the pesticide to prevent it from contacting handlers or other people AND the system is functioning properly and is used and maintained in accordance with the manufacturers written operating instructions, the handlers need not wear a respirator, provided the required respirator is immediately available for use in an emergency such as a spill or equipment breakdown.

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)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

User should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

Do not contaminate water by cleaning of equipment or disposal of equipment washwaters.

This pesticide is toxic to mammals.

Treatment of aquatic plants can result in oxygen loss from decomposition of dead plants. This loss can cause fish suffocation. Water bodies containing very high plant density should be treated in sections to prevent suffocation of fish.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift.

- For quiescent or slow moving water treatments: Waters treated with Aquathol K may be used for swimming, fishing, and irrigating turf, ornamental plants and crops immediately after treatment with the following exceptions: Do not use the Aquathol K treated water to irrigate the following for 7 days after the treatment: annual nursery or greenhouse crops including hydroponics and newly seeded or transplanted annual crops, newly seeded or transplanted ornamentals, and newly sodded or seeded turf. Do not use treated water for animal consumption within the following periods:
 - 0.5 ppm dipotassium salt – 7 days after application
 - 4.25 ppm dipotassium salt – 14 days after application
 - 5.0 ppm dipotassium salt – 25 days after application
- For flowing water treatments: Waters treated with Aquathol K may be used for swimming, fishing, livestock watering, and irrigating turf, ornamental plants and crops immediately after treatment with the following exceptions: Do not use the Aquathol K treated water to irrigate the following: annual nursery or greenhouse crops including hydroponics and newly seeded or transplanted annual crops, newly seeded or transplanted ornamentals, and newly sodded or seeded turf.
- Phytotoxicity is not expected on plants or crops irrigated with Aquathol K treated water, however, all species and cultivars (varieties) have not been tested.
- Undiluted Aquathol K may be injurious to crops, grass, ornamentals, and other foliage.
- Do not use Aquathol K treated water for chemigation as interactions between Aquathol K and other pesticides and fertilizers are not known.
- Do not use Aquathol K in brackish or saltwater.
- Wash out spray equipment with water after each operation.
- Avoid contact of spray concentrate (product) directly or by drift with non-target plants or crops as injury may result.

HOW TO APPLY:

Aquathol K is a contact herbicide; consequently, apply when target plants are present.

Aquathol K should be sprayed on the water or injected below the water surface. It may be applied as a concentrate or diluted with water depending on the equipment.

In instances where the plant(s) to be controlled is an exposed surface problem (i.e., some of the broad-leaved pond weeds) coverage is important. For best results, apply the concentrate with the least amount of water compatible with the application equipment.

Drinking Water (Potable Water)

Consult with appropriate state or local water authorities before applying this product to public waters. State or local agencies may require permits.

The drinking water (potable water) restrictions on this label are to ensure that consumption of water by the public is allowed only when the concentration of endothall acid in the water is less than the MCL (Maximum Contamination Level) of 0.1 ppm. Applicators should consider the unique characteristics of the treated waters to assure that endothall acid concentrations in potable drinking water do not exceed 0.1 ppm at the time of consumption.

For Lakes, Ponds, and other Quiescent Water Bodies:

- For Aquathol K applications, the drinking water setback distance from functioning potable water intakes in the treated water body must be greater than or equal to 600 feet.
- Note: Existing potable water intakes that are no longer in use, such as those replaced by a connection to a municipal water system or a potable water well, are not considered to be functioning potable water intakes.

For Irrigation Canals and other Flowing Water Bodies:

- Applicator is responsible to assure that treated water does not enter potable water intakes. For Aquathol K applications, potable water intakes must be closed when treated water is present at the intake. In the event the water intake cannot be closed, treatments must only be made downstream from the intake in order to assure Aquathol K treated water does not enter the potable water system.

QUIESCENT OR SLOW MOVING WATER TREATMENTS: SURFACE OR INJECTED APPLICATIONS

For aquatic plant control in quiescent or slow moving water, Aquathol K recommended use rates can be found in the following chart. Since the active ingredient is water soluble and tends to diffuse from the treated area, select the dosage rate applicable to the area to be treated. Marginal treatments of large bodies of water require higher rates as indicated.

Use higher labeled rates of Aquathol K when making treatments to small areas with an increased potential for rapid dilution or when treating narrow areas such as boat lanes or shoreline treatments where dilution may reduce the exposure of plants to Aquathol K.

Use lower labeled rates of Aquathol K for large contiguous treatment blocks or in protected areas such as coves where reduced water movement will not result in rapid dilution of Aquathol K from the target treatment area or when treating entire lakes or ponds.

PLANTS CONTROLLED AND AQUATHOL K DOSAGE RATE CHART

Aquatic Plant	APPLICATION RATE			
	Entire Pond/Lake or Large Area Treatment		Spot or Lake Margin Treatment	
	ppm Dipotassium Endothall	gallons Aquathol K per Acre Ft.	ppm Dipotassium Endothall	gallons Aquathol K per Acre Ft.
Bur Reed, Sparganium spp.	3.0-4.0	1.9-2.6	4.0-5.0	2.6-3.2
Coontail, Ceratophyllum spp.	2.0-3.0	1.3-1.9	3.0-5.0	1.9-3.2
Horned Pondweed, Zannichellia palustris	2.0-3.0	1.3-1.9	3.0-5.0	1.9-3.2
Sago Pondweed, Stuckenia pectinata	1.0-2.0	0.6-1.3	2.0-5.0	1.3-3.2
Hydrilla, Hydrilla verticillata	1.0-4.0	0.6-2.6	2.0-5.0	1.3-3.2
Hygrophila*, Hygrophila polysperma	4.0-5.0	2.6-3.2	5.0	3.2
Milfoil, Myriophyllum spp.	2.0-3.0	1.3-1.9	3.0-5.0	1.9-3.2
Naiad, Najas spp.	2.0-4.0	1.3-2.6	3.0-5.0	1.9-3.2
Pondweed, Potamogeton spp.	0.75-3.0	0.45-1.9	1.5-5.0	1.0-3.2
Including:				
American, P. nodosus	2.0-3.0	1.3-1.9	3.0-5.0	1.9-3.2
Largeleaf (Bass Weed), P. amplifolius	2.0-3.0	1.3-1.9	3.0-5.0	1.9-3.2
Curlyleaf, P. crispus	0.75-1.5	0.45-1.0	1.5-5.0	1.0-3.2
Flatstem, P. zosteriformis	2.0-3.0	1.3-1.9	3.0-5.0	1.9-3.2
Floating-leaf, P. natans	1.0-2.0	0.6-1.3	2.0-5.0	1.3-3.2
Illinois, P. Illinoisensis	1.5-2.5	1.0-1.6	2.5-5.0	1.6-3.2
Narrowleaf, P. pusillus	1.0-2.0	0.6-1.3	2.0-5.0	1.3-3.2
Threadleaf, P. filiformis	2.0-3.0	1.3-1.9	3.0-5.0	1.9-3.2
Variable Leaf, P. diversifolius	1.0-2.0	0.6-1.3	2.0-5.0	1.3-3.2
Parrotfeather, Myriophyllum aquaticum	2.0-3.0	1.3-1.9	3.0-5.0	1.9-3.2
Water Stargrass, Heteranthera spp.	2.0-3.0	1.3-1.9	3.0-5.0	1.9-3.2

* Suppression only

The following charts indicate the quantity of Aquathol K to be applied.

Gallons of Aquathol K to Treat One Acre-Foot of Water

	Rate (ppm)						
	0.75	1.0	1.5	2.0	3.0	4.0	5.0
1 acre ft.	gallons/A-ft.						
	0.45	0.6	1.0	1.3	1.9	2.6	3.2

Fluid Ounces of Aquathol K to Treat 1,000 Square-Foot per Foot of Depth

	Rate (ppm)						
	0.75	1.0	1.5	2.0	3.0	4.0	5.0
1,000 ft. ²	fl. oz./1,000 ft. ²						
	1.4	1.9	2.8	3.8	5.7	7.6	9.4

**FLOWING WATER TREATMENTS (WITH THE EXCEPTION OF IRRIGATION CANALS):
DRIP OR METERING SYSTEM APPLICATIONS**

For aquatic plant control in flowing water, Aquathol K recommended use rates can be found in the following chart. Apply Aquathol K in a manner to achieve the desired rate and adequate mixing so product is distributed throughout the entire water column. Adequate concentration (rate) and exposure time (length of treatment) will impact Aquathol K efficacy on the target plant species. Although Aquathol K is a contact herbicide adequate exposure time is critical. The rates and the length of treatment are guidelines to control the target species. The following rate chart has been developed based on Concentration Exposure Time (CET) data for Aquathol K. The CET concept allows rates and the length of exposure to be adjusted for different treatment scenarios.

AQUATHOL K APPLICATION RATES FOR FLOWING WATER TREATMENTS

Plant Species	Length of Treatment (hours)							
	6	8	12	18	24	36	48	72
	Rate (ppm)							
Pondweeds (Potamogeton spp.) Sago Pondweed (Stuckenia pectinata)	4.0-5.0	3.0-4.0	2.0-3.0	1.5-2.5	1.0-2.0	0.75-1.5	0.5-1.0	0.5
Milfoil (Myriophyllum spp.) Parrotfeather (Myriophyllum aquaticum) Coontail (Ceratophyllum spp.) Horned pondweed (Zannichellia spp.) Hydrilla (Hydrilla verticillata) Naiad (Najas spp.) Water Stargrass (Heteranthera spp.)	5.0	4.0-5.0	3.0-4.0	2.0-3.0	1.5-2.5	1.0-2.0	0.75-1.5	0.5-1.0

NOTE: Hygrophila (Hygrophila polysperma) may be suppressed at the higher application rates listed in this table.

Restrictions: Do not apply more than 30 ppm per growing season, not to exceed 5 ppm per application. Do not apply more than a total of 5 ppm within a 7-day interval.

Note: There is no Pre-harvest Interval (PHI) for crops irrigated with treated water.

To calculate the amount of Aquathol K required for a particular treatment use the following formula:

[Cubic Feet per Second (CFS) X Length of Treatment (hrs.) X Rate (ppm)] x 0.052947 = Gallons of Aquathol K Needed for Treatment

To calculate the amount of Aquathol K to be applied per hour use the following formula:

Gallons of Aquathol K per Hour = Total Gallons of Aquathol K / Length of Treatment (hrs.)

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Store in the original container. Do not store in a manner where cross-contamination with other pesticides, fertilizers, food or feed could occur. Storage at temperatures below 32°F may result in the product freezing or crystallizing. Should this occur the product must be warmed to 50°F or higher and thoroughly agitated. In the event of a spill during handling or storage, absorb with sand or other inert material and dispose of absorbent in accordance with the Pesticide Disposal instructions listed below.

Pesticide Disposal: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Handling:

(for Nonrefillable containers)

Nonrefillable container. Do not reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying.

For containers 5 gallons or less:

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Or

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

For containers more than 5 gallons:

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

Or

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 PSI for at least 30 seconds. Pour or pump rinsate into application equipment or rinsate collection system. Drain for 10 seconds after the flow begins to drip.

Then offer for recycling if available or 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.

(for Refillable containers)

Refillable container. Refill this container with pesticide only. Do not use this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Then offer for recycling if available or reconditioning if appropriate or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

EMERGENCY TELEPHONE NUMBERS

CHEMTREC: (800) 424-9300

MEDICAL: (866) 673-6671 Rocky Mountain Poison Control Center

**IMPORTANT INFORMATION
READ BEFORE USING PRODUCT**

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product reflect the opinion of experts based on field use and tests, and must be followed carefully. It is impossible to eliminate all risks associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of United Phosphorus, Inc. or Seller. Handling, storage, and use of the product by Buyer or User are beyond the control of United Phosphorus, Inc. and Seller. All such risks shall be assumed by Buyer and User, and Buyer and User agree to hold United Phosphorus, Inc. and Seller harmless for any claims relating to such factors.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, UNITED PHOSPHORUS, INC. AND SELLER MAKE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ON THIS LABEL.

To the extent consistent with applicable law, United Phosphorus, Inc. or Seller shall not be liable for any incidental, consequential or special damages resulting from the use or handling of this product and **THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF UNITED PHOSPHORUS, INC. AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF UNITED PHOSPHORUS, INC. OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

United Phosphorus, Inc. and Seller offer this product, and Buyer and User accept it, subject to the foregoing conditions of sale and limitations of warranty and of liability, which may not be modified except by written agreement signed by the duly authorized representative of United Phosphorus, Inc.

Aquathol is a registered trademark of United Phosphorus, Inc.

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Rev. 9/15/11

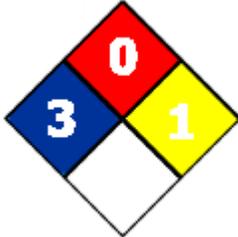
70506-176(092211-4047)

Made in U.S.A.



Material Safety Data Sheet

United Phosphorus, Inc.

NFPA	PPE		
			

Issued Date 07-Feb-2007

Revision Date 21-Dec-2010

Revision Number: 5

1. PRODUCT AND COMPANY IDENTIFICATION

UPI
 630 Freedom Business Center
 Suite 402
 King of Prussia, PA 19406

Emergency Telephone Number
 Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
 Medical: Rocky Mountain Poison Control Center
 (866) 673-6671 (24hrs)

Company Information
 UPI

Contact Information
 Customer Service

Phone Number
 1-800-438-6071

Available Hrs
 8:00 am to 5:00 pm EST

Product Name AQUATHOL® K Aquatic Herbicide
EPA Reg # 70506-176
Recommended Use Aquatic herbicide
Product Code 12-204

2. HAZARDS IDENTIFICATION

Emergency Overview

Causes irreversible eye damage
 May be fatal if swallowed.
 Harmful if inhaled
 Harmful if absorbed through skin

Prolonged skin contact may cause local redness. May cause an allergic reaction in sensitive individuals.

DANGER!

Appearance Yellow, Brown.

Physical State Liquid.

Odor Slight chlorine.

Potential Health Effects

- Principle Routes of Exposure
- Inhalation
- Skin contact

Eyes
Skin

Causes irreversible eye damage..
 May cause mild skin irritation. Repeated or prolonged exposure may cause severe skin irritation.. Prolonged contact can result in redness and blistering of skin..

Inhalation
Ingestion

Slightly toxic if inhaled.
 Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients Name

Chemical Name	CAS-No	Weight %	OSHA PEL
Dipotassium endothall salt	2164-07-0	40.3	N/A

4. FIRST AID MEASURES

Eye Contact

Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye.
 Call a poison control center or doctor for treatment advice.

Skin Contact

Take off contaminated clothing.
 Rinse skin immediately with plenty of water for 15-20 minutes.
 Call poison control center or doctor for treatment advice.

Inhalation

Move to fresh air
 If person is not breathing, call 911 or an ambulance, then give artificial respiration.
 Call a poison control center or doctor for further treatment advice.

Ingestion

Call a physician or Poison Control Center immediately
 Have person sip a glass of water if able to swallow
 Do not induce vomiting unless told to do so by a poison control center or doctor
 Never give anything by mouth to an unconscious person

Notes to Physician

No information available
Treat symptomatically

5. FIRE-FIGHTING MEASURES

Flammable Explosive Properties

Flash Point
Autoignition Temperature

Not available
Not available

Flammability Limits in Air

Not available

Extnguishing Media

Use: Water spray, Carbon dioxide (CO2), Dry chemical,

Fire/Explosion Hazard

No information available

Hazardous Combustion Products

Extreme temperatures convert Endothall product to endothall anhydride which is a strong vessicant causing blistering of eyes, mucous membranes and skin.

NFPA

Health 3

Flammability 0

Instability 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions

Avoid contact with skin, eyes and clothing.

Environmental Precautions

Do not flush into surface water or sanitary sewer system. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits..

Methods for Clean-up

Remove all ignition sources. Soak up with inert absorbent material. Ground and bond containers when transferring material. Keep in suitable and closed containers for disposal.

7. HANDLING AND STORAGE

Handling

Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing. Keep out of reach of children. Empty containers may contain hazardous residues.

Storage

Store in an area where cross-contamination with pesticides, fertilizers, food or feed could not occur. .

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
Engineering Controls	Investigate engineering techniques to reduce exposures. Local mechanical exhaust ventilation is preferred. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems. . PESTICIDE APPLICATORS & WORKERS. THESE WORKERS MUST REFER TO PRODUCT LABELING AND DIRECTIONS FOR USE IN ACCORDANCE WITH EPA WORKER PROTECTION STANDARD 40 CFR PART 170..
Personal Protective Equipment	
Eye/face Protection	Tightly fitting safety goggles. or. Face-shield.
Skin Protection	Chemical resistant gloves. Long sleeved clothing. Long pants. Chemical resistant footwear plus socks. Chemical resistant apron.
Respiratory Protection	Where airborne exposure is likely, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. If exposures cannot be kept at a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure, use an approved full face positive-pressure, self-contained breathing apparatus. Respiratory protection programs must comply with 29 CFR 1910.134. .
General Hygiene Considerations	Do not eat, drink or smoke when using this product. Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Yellow Brown	Odor	Slight chlorine
Physical State	Liquid	pH	7.4
Boiling Point/Range	>100 °C	Melting Point/Range	Not available
Specific Gravity	1.285	Solubility	Miscible
Evaporation Rate	Not available	Vapor Pressure	Not available
Vapor Density	Not available	VOC Content	Not available
Viscosity	Not available	Molecular Weight	No data available
Bulk Density	No data available	Percent Solids	Not available
Percent Volatiles	59.7		

10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions
Conditions to Avoid	No information available.
Incompatible Materials	No materials to be especially mentioned
Hazardous Decomposition Products	Extreme temperatures may convert endothall product to endothall anhydride, a strong vessicant, causing blistering of eyes, mucous membranes and skin. .
Possibility of Hazardous Polymerization	None under normal processing

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

Although no allergic skin reactions were observed in guinea pigs following exposure to this material in water, allergic skin reactions were observed following exposure to this material in ethanol. Repeated application to the skin of rats produced severe skin irritation, liver, and kidney effects considered to be secondary to irritation, and increased mortality. Long-term dietary administration produced no adverse effects in rats. Dermal - Slightly toxic to Rabbits (LD50 2,000 mg/kg)

Skin irritation - Non-irritating to rabbits Inhalation - Slightly toxic to rats (4 hr LC50 0.83 mg/l) aerosol Eye irritation - Cause irreversible eye damage in rabbits.

Endothall- Intentional swallowing of 40 ml led to death within 12-hours. Skin allergy was observed in guinea pigs following repeated exposures. Repeated dietary administration (via gelatin capsules) produced vomiting, diarrhea, sluggish movements, and liver, kidney and blood effects in dogs. Long-term dietary administration to rats and mice produced effects in the glandular stomach. High mortality rates and intestinal tumors considered to be secondary to the effects in the stomach were observed in mice. Long-term application to the skin of mice produced no tumors. No birth defects were observed in the offspring of rats exposed orally during pregnancy, even at dosages that produced adverse effects on the mothers. Skeletal anomalies were observed in the offspring of rabbits and mice exposed orally during pregnancy, but only at dosages that produced adverse effects in the mothers. No genetic changes were observed in tests using bacteria, animal cells or animals.

Chronic Toxicity

There are no known carcinogenic chemicals in this product

Carcinogenicity

12. ECOLOGICAL INFORMATION

Ecotoxicity

Endothall dipotassium salt ecotoxicity

Acute Contact Toxicity Honey Bee (*Apis mellifera*)

For endothall acid, mono-amine salt, and dipotassium salt:

Practically non-toxic

Acute Toxicity Avian

Mallard duck(*Anas platyrhynchos*), LD50 = 328 mg/kg

Acute Toxicity Freshwater Fish

Bluegill sunfish(*Lepomis macrochirus*),flow-thru, EC50 = 1071 ppm

Rainbow trout(*Oncorhynchus mykiss*),flow-thru,EC50 =363 ppm

Chanel catfish(*Ictalurus punctatus*), static, EC50 = >100 ppm

Acute Toxicity Freshwater Invertebrates

Waterflea(*Daphnia magna*), flow-thru 48hr, EC50 = 223 ppm

Scud(*Gammarius lacustris*),static 48hr, EC50 = 313 ppm

Acute Toxicity Estuarine/Marine Fish

Sheepshead minnow(*Cyrinodon variegates*), flow-thru 96hr,
EC50 = 340 ppm

Coho salmon(*Oncorhynchus kisutch*)static, 96hr, EC50 = >100ppm

Acute Toxicity Estuarine/Marine Invertebrates

Mysid shrimp(*Mysidopsis bahia*), flow-thru 96hr, EC50 = 257 ppm

Eastern oyster(*Crassostrea virginica*)shell deposition,
flow-thru 96hr, EC50 = 335 ppm

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide or rinsate is a violation of Federal law. If the wastes cannot be disposed of by use or according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance. .

Contaminated Packaging

Non refillable container. Do not reuse this container. . Triple rinse or pressure rinse promptly after emptying. . Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Then offer for recycling if available or 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

DOT

Proper Shipping Name Pesticides, liquid, toxic. n.o.s. (Endothal)
Hazard Class 6.1
UN-No 2902
Packing Group PG III
Reportable Quantity (RQ): 1,000 lbs

ICAO

UN-No 2902
Proper Shipping Name Pesticide, liquid, toxic, n.o.s. (Endothall)
Hazard Class 6.1
Packing Group PG III

IATA

UN-No 2902
Proper Shipping Name Pesticide, liquid, toxic, n.o.s. (Endothall)
Hazard Class 6.1
Packing Group PG III
ERG Code 6L

IMDG/IMO

Proper Shipping Name Pesticide, liquid, toxic, n.o.s. (Endothall)
Hazard Class 6.1
UN-No 2902
Packing Group PG III
EmS No. F-A, S-A

15. REGULATORY INFORMATION

International Inventories

Dipotassium endothall salt
NDSL Listed
EINECS/ELINCS Listed

USA

Federal Regulations

SARA 313

Y

Chemical Name	CAS-No	Weight %
Dipotassium endothall salt	2164-07-0	40.3

SARA 311/312 Hazardous Categorization

Chronic Health Hazard No
Acute Health Hazard Yes
Fire Hazard No

12-204 - AQUATHOL® K Aquatic Herbicide

Sudden Release of Pressure Hazard
Reactive Hazard

No
No

Clean Water Act

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product does not contain any HAPs.

CERCLA

RCRA

Pesticide Information

State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

State Right-to-Know

International Regulations

Mexico - Grade

Not available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

Not determined

16. OTHER INFORMATION

Revision Date

21-Dec-2010

Revision Summary

Update section 2 Update section 8

UPI, Inc. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with other materials or in any process. Further, since the conditions and methods of use are beyond the control of UPI, Inc. UPI, Inc. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

End of MSDS

SPECIMEN

CLEARCAST®

herbicide

For the control of vegetation in and around aquatic and noncropland sites

Active Ingredient:

ammonium salt of imazamox 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-5-(methoxymethyl)-3-pyridinecarboxylic acid* 12.1%

Other Ingredients: 87.9%

Total: 100.0%

*Equivalent to 11.4% 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-5-(methoxymethyl)-3-pyridinecarboxylic acid (1 gallon contains 1.0 pound of active ingredient as the free acid)

US Patent No. 5,334,576

EPA Reg. No. 241-437

EPA Est. No.

KEEP OUT OF REACH OF CHILDREN CAUTION/PRECAUCIÓN

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

See inside for complete **First Aid, Precautionary Statements, Directions For Use, Conditions of Sale and Warranty**, and state-specific crop and/or use site restrictions.

In case of an emergency endangering life or property involving this product, call day or night 1-800-832-HELP (4357).

Net Contents:

FIRST AID

If on skin or clothing	<ul style="list-style-type: none">• 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 in eyes	<ul style="list-style-type: none">• 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 inhaled	<ul style="list-style-type: none">• Move person to fresh air.• If person is not breathing, call 911 or an ambulance; then give artificial respiration, preferably mouth-to-mouth if possible.• Call a poison control center or doctor for further treatment advice.

HOTLINE NUMBER

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact BASF Corporation for emergency medical treatment information: 1-800-832-HELP (4357).

Precautionary Statements

Hazards to Humans and Domestic Animals

CAUTION. Harmful if absorbed through skin or inhaled. Avoid breathing spray mist. Avoid contact with skin, eyes or clothing.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for **Category A** on an EPA chemical-resistance category selection chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves, such as butyl rubber ≥ 14 mils, or natural rubber ≥ 14 mils, or neoprene rubber ≥ 14 mils, or nitrile rubber ≥ 14 mils
- Shoes plus socks

Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

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.

Environmental Hazards

This pesticide may be hazardous to plants outside the treated area. **DO NOT** apply to water except as specified in this label. **DO NOT** contaminate water when disposing of equipment washwaters and rinsate.

Directions For Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling. This labeling must be in the possession of the user at the time of pesticide application.

DO NOT apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Ensure spray drift to nontarget species does not occur.

DO NOT apply **Clearcast® herbicide** in any manner not specifically described in this label.

Observe all cautions and limitations on this label and on the labels of products used in combination with **Clearcast**. **DO NOT** use **Clearcast** other than in accordance with the instructions set forth on this label. Keep containers closed to avoid spills and contamination.

STORAGE AND DISPOSAL

DO NOT contaminate food, feed or water by storage or disposal.

Pesticide Storage

Keep from freezing.

DO NOT store below 32° F.

DO NOT contaminate water, food or feed by storage or disposal.

Pesticide Disposal

Wastes resulting from the use of this product may be disposed of on-site or at an approved waste disposal facility.

(continued)

STORAGE AND DISPOSAL *(continued)*

Container Disposal

Nonrefillable Container. DO NOT reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

Triple rinse containers small enough to shake (capacity ≤ 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Triple rinse containers too large to shake (capacity > 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

In Case of Emergency

In case of large-scale spillage regarding this product, call:

- CHEMTREC 1-800-424-9300
- BASF Corporation 1-800-832-HELP (4357)

In case of medical emergency regarding this product, call:

- Your local doctor for immediate treatment
- Your local poison control center (hospital)
- BASF Corporation 1-800-832-HELP (4357)

Steps to be taken in case material is released or spilled:

- Dike and contain the spill with inert material (sand, earth, etc.) and transfer liquid and solid diking material to separate containers for disposal.
- Remove contaminated clothing, and wash affected skin areas with soap and water.

- Wash clothing before reuse.
- Keep the spill out of all sewers and open bodies of water.

General Information

Clearcast® herbicide is an aqueous formulation that may be diluted in water and either applied directly to water for the control/suppression of certain submerged aquatic vegetation or applied as a broadcast or spot spray to floating and emergent vegetation. Aquatic sites that may be treated include estuarine and marine sites, ponds, lakes, reservoirs, wetlands, marshes, swamps, bayous, arroyos, ditches, canals, streams, rivers, creeks and other slow-moving or quiescent bodies of water. **Clearcast** may also be used during drawdown conditions. **Clearcast** may also be applied to noncropland sites for terrestrial and riparian vegetation control.

Clearcast is quickly absorbed by foliage and/or plant roots and rapidly translocated to the growing points stopping growth. Susceptible plants may develop a yellow appearance or general discoloration and will eventually die or be severely growth inhibited.

Clearcast is herbicidally active on many submerged, emergent and floating broadleaf and monocot aquatic plants. The relative levels of control and selectivity can be manipulated by using a choice of rates and herbicide placement (water injected or floating/emergent foliar application).

To help maintain the utility of herbicide programs, the use of herbicides with different modes of action are effective in managing weed resistance.

SPRAY ADJUVANTS

Applications of **Clearcast** targeting emergent, floating or shoreline species require the use of a spray adjuvant. Always use a spray adjuvant that is appropriate for aquatic sites.

Nonionic Surfactants. Use a nonionic surfactant at the rate 0.25% volume/volume (v/v) or higher (see manufacturer's label) of the spray solution (0.25% v/v is equivalent to 1 quart in 100 gallons). For best results, select a nonionic surfactant with an HLB (hydrophilic to lipophilic balance) ratio between 12 and 17 with at least 70% surfactant in the formulated product (alcohols, fatty acids, oils, ethylene glycol or diethylene glycol should not be considered as surfactants to meet the above requirements).

Methylated Seed Oils or Vegetable Oil Concentrates. Instead of a surfactant, a methylated seed oil or vegetable-based seed oil concentrate may be used at the rate of 1.5 to 2 pints per acre. When using spray volumes greater than 30 gallons per acre, methylated seed oil or vegetable-based seed oil concentrates should be mixed at a rate of 1% of the total spray volume, or alternatively use a non-ionic surfactant as described above. Research indicates that these oils may aid in **Clearcast** deposition and uptake by plants under stress.

Silicone-based Surfactants. See manufacturer's label for specific rate recommendations. Silicone-based surfactants

may reduce the surface tension of the spray droplet allowing greater spreading on the leaf surface as compared to conventional nonionic surfactants. However, some silicone-based surfactants may dry too quickly, limiting herbicide uptake.

Invert Emulsions. **Clearcast® herbicide** can be applied as an invert emulsion. The spray solution results in an invert (water-in-oil) spray emulsion designed to minimize spray drift and spray runoff, resulting in more herbicide on the target foliage. The spray emulsion may be formed in a single tank (batch mixing) or injected (in-line mixing). Consult the invert chemical label for proper mixing directions.

Other. An antifoaming agent, spray pattern indicator, sinking agent or drift-reducing agent may be applied at the product labeled rate if necessary or desired.

Aquatic Use Directions

Clearcast may be applied directly to the water for the control of submerged aquatic plant species and some emergent and floating species, or as a foliar application specifically for emergent and floating species.

DO NOT exceed maximum use rate per application:

Water treatment - 500 ppb
(173 fluid ozs of **Clearcast** per acre foot)

Foliar broadcast application - 2 quarts per acre
(0.5 lb ae/A)

Foliar spot application - up to 5% **Clearcast** by volume

Clearcast may be applied via surface and aerial equipment including both fixed-wing aircraft and helicopter.

Spray Drift Requirements For Aerial Application

- Applicators are required to use a coarse or coarser droplet size (ASABE S572) or, if specifically using a spinning atomizer nozzle, applicators are required to use a volume mean diameter (VMD) of 385 microns or greater for release heights below 10 feet. Applicators are required to use a very coarse or coarser droplet size or, if specifically using a spinning atomizer nozzle, applicators are required to use a VMD of 475 microns or greater for release heights above 10 feet. Applicators must consider the effects of nozzle orientation and flight speed when determining droplet size.
- Applicators are required to use upwind swath displacement.
- The boom length must not exceed 60% of the wingspan or 90% of the rotor blade diameter to reduce spray drift.
- **DO NOT** apply when wind speed is greater than 10 mph.
- If applying at wind speeds less than 3 mph, the applicator must determine if
 1. Conditions of temperature inversion exist **or**
 2. Stable atmospheric conditions exist at or below nozzle height.

DO NOT make applications into areas of temperature inversions or stable atmospheric conditions.

Spray Drift Requirements For Ground Boom Application

- Applicators are required to use a nozzle height below 4 feet above the ground or plant canopy and coarse or coarser droplet size (ASABE S572) or, if specifically using a spinning atomizer nozzle, applicators are required to use a volume mean diameter (VMD) of 385 microns or greater.
- Applications with wind speeds greater than 10 mph are prohibited.
- Applications into temperature inversions are prohibited.

DO NOT apply when wind conditions may result in drift, when temperature inversion conditions exist, or when spray may be carried to sensitive areas. See **Managing Off-target Movement** section for more drift reduction recommendations.

SURFACE APPLICATION

Application to targeted emergent and/or floating

vegetation. To make surface applications targeting emergent or floating vegetation, uniformly apply with properly calibrated broadcast or spot treatment equipment in 10 or more gallons of water per acre. Spot treatments can be made with up to 5% **Clearcast** by volume. To ensure thorough spray coverage, higher spray volumes may be required when treating areas with large and/or dense vegetation. Use an appropriate spray pressure to minimize the drift potential depending upon spray equipment, conditions and application objectives.

Guidelines for Foliar Treatment of Emergent and Floating Vegetation

- Always use a surfactant for foliar applications of emergent and floating weeds.
- Foliar applications of **Clearcast** may be made as a broadcast spray or as a spot spray with a percent spray solution ranging from 0.25% to 5% **Clearcast** by volume.
- Control will be reduced if spray is washed off foliage by wave action.

In aquatic sites, those application techniques described in the **Terrestrial Use Directions** section may be used to treat emergent vegetation.

Application to water targeting submerged and/or emergent/floating vegetation.

Clearcast may be broadcast applied to the water surface or injected below the water surface. **Clearcast** may be applied as undiluted product or diluted with water prior to application. Under surface-matted conditions, **Clearcast** should be injected below the water surface to achieve better product distribution.

Apply **Clearcast** to water to achieve a final concentration of the active ingredient of no more than 500 ppb. Multiple applications of **Clearcast** may be made during the annual growth cycle to maintain the desired vegetation response.

Clearcast® herbicide Rates Per Treated Surface Acre

Average Water Depth of Treatment Site (feet)	Desired Active Ingredient Concentration (ppb)*			
	50	100	200	500
	Clearcast Rate per Treated Surface Acre (fl ozs)			
1	17	35	69	173
2	35	69	138	346
3	52	104	207	518
4	70	138	277	691
5	87	173	346	864
6	104	207	415	1037
7	122	242	484	1210
8	139	277	553	1382
9	157	311	622	1555
10	174	346	691	1728

* Clearcast contains 1.0 pound of active ingredient per gallon. There are 128 fl ozs in one gallon.

AERIAL APPLICATION

Clearcast may be applied by both fixed wing aircraft and helicopter. There is no minimum spray volume when making applications directly to the water. For applications targeting emergent and/or floating vegetation, uniformly apply with properly calibrated equipment in 5 or more gallons of water per surface acre. For best results, aerial applications should be made using a minimum of 20 gallons per acre.

DRAWDOWN APPLICATION

Clearcast may be used in drawdown situations to provide postemergence and/or preemergence control/suppression of aquatic vegetation. Apply Clearcast as a broadcast spray at rates up to 64 fl ozs/A or as a spot spray treatment with up to 5% Clearcast by volume. Applications should be made when water has receded and exposed soil is moist to dry. For postemergence (foliar) applications, wait at least two weeks after application before reintroducing water. When treating irrigation canals, the initial flush of recharge water after application must not be used for irrigation purposes.

Restrictions and Limitations

General Limitations

DO NOT apply Clearcast to achieve a total active ingredient concentration in the water greater than 500 ppb.

DO NOT apply more than 2 quarts of Clearcast per surface acre for the control of emergent and floating vegetation.

Irrigation Restrictions

- **DO NOT** use treated water to irrigate greenhouses, nurseries or hydroponics.
- **DO NOT** plant non-CLEARFIELD® canola, onions, potatoes, or sugar beets in soils that have been previously

irrigated with Clearcast-treated water until a soil bioassay successfully demonstrates acceptable levels of crop tolerance.

- **DO NOT** use any Clearcast-treated waters from still or quiescent sources for irrigation purposes less than 24 hours after Clearcast application is completed.
- Waters receiving Clearcast either as a water treatment or as a foliar treatment on emergent/floating plants may be used for irrigation as long as concentrations are ≤ 50 ppb. Treated waters resulting in concentrations > 50 ppb may not be used for irrigation until residue levels have been shown to be ≤ 50 ppb by an acceptable method.
- Still and quiescent waters with an average depth of four (4) or more feet receiving a foliar application of Clearcast (≤ 2 quarts per acre) to emergent/floating vegetation may be used for irrigation on allowable sites 24 hours after application is completed.
- There are no irrigation restrictions on allowable sites for the use of treated water from flowing waters, such as irrigation canals with an average depth of four (4) or more feet, receiving a foliar application of Clearcast (≤ 2 quarts per acre) to emergent/floating vegetation.
- After application of Clearcast to dry irrigation canals/ditches, the initial flush of water during recharge must not be used for irrigation purposes.

Other Water Use Restrictions

There are no restrictions on livestock watering, swimming, fishing, domestic use, or use of treated water for agricultural sprays.

Potable Water. Clearcast may be applied to potable water sources at concentrations up to 500 ppb to within a distance of 1/4 mile from an active potable water intake. Within 1/4 mile of an active potable water intake, Clearcast may be applied, but water concentrations resulting from injection and/or foliar applications may not exceed 50 ppb. If water concentrations greater than 50 ppb are required, the potable water intake must be shut and, if necessary, an alternate water supply be made available until the water concentration can be shown to be less than 50 ppb by an acceptable method.

Endangered Plant Species

To prevent potential negative impacts to endangered plant species, **DO NOT** apply Clearcast in a way that adversely affects federally listed endangered and threatened species.

Emergent, Floating, and Shoreline Species Controlled with Foliar Applications

Common Name	Scientific Name	Rate (fl ozs/A)	Comments
Alligatorweed	<i>Alternanthera philoxeroides</i>	64	Repeat applications may be necessary. Add 1 qt/A of Rodeo® herbicide for quicker brownout.
American lotus	<i>Nelumbo lutea</i>	64	
Arrowhead	<i>Sagittaria</i> spp.	32	
Cattail	<i>Typha</i> spp.	32 to 64	Apply after full green up through killing frost.
Chinese tallowtree	<i>Sapium sebiferum</i>	32 to 64	
Common reed	<i>Phragmites</i> spp.	64	Use 1 qt/A methylated seed oil (MSO); apply in late vegetative stage up to killing frost. May also be applied as a spot treatment using 1% to 2% Clearcast® herbicide per spray volume. Older stands of phragmites and stands growing in water may be more difficult to control and will require follow-up applications.
Common salvinia	<i>Salvinia minima</i>	32 to 64	Apply with MSO or MSO + silicone-based surfactant; retreatment will be necessary.
Floating pennywort	<i>Hydrocotyle ranunculoides</i>	32 to 64	Repeat applications may be necessary.
Four-leaf clover	<i>Marsilea</i> spp.	32	
Frogbit	<i>Lymnobia spongia</i>	16 to 32	Water concentrations of 50 to 100 ppb will control frogbit.
Mexican lily	<i>Nymphaea mexicana</i>	32 to 64	
Mosquito fern	<i>Azolla</i> spp.	—	Apply using 2% Clearcast and 1% MSO by volume.
Parrotfeather	<i>Myriophyllum aquaticum</i>	64	Apply only to emergent vegetation.
Pickerelweed	<i>Pontederia cordata</i>	32	
Smartweed	<i>Polygonum</i> spp.	16 to 32	
Variable-leaf milfoil	<i>Myriophyllum heterophyllum</i>	64	Apply with MSO (1% v/v) as an emergent foliar treatment when plants have emerged on the surface. May also be applied as spot treatment using 1 to 3% Clearcast per spray volume.
Water chestnut	<i>Trapa natans</i>	64	Apply with MSO to emergent part of plant. May also be applied as a spot treatment using 2% Clearcast per spray volume.
Water hyacinth	<i>Eichhornia crassipes</i>	16 to 32	Water concentrations of 50 to 100 ppb will control water hyacinth.
Water primrose	<i>Ludwigia</i> spp.	32	Add 1 qt/A of Rodeo for quicker brownout.
Watershield	<i>Brasenia schreberi</i>	48 to 64	Water concentrations of 50 to 100 ppb will control watershield.
Water lily	<i>Nymphaea</i> spp.	32 to 64	
Spatterdock	<i>Nuphar lutea</i>	64	

Submersed Species Controlled with Water-injected Applications

Common Name	Scientific Name	Rate (ppb)	Comments
Bladderwort	<i>Utricularia floridana</i> <i>U. inflata</i>	50 to 100	
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	100 to 200	See Special Weed Control for application directions.
Hydrilla	<i>Hydrilla verticillata</i>	150 to 200	See Special Weed Control for application directions.
Northern watermilfoil	<i>Myriophyllum exalbescens</i>	100 to 200	
Pondweed, American flat stemmed leafy Illinois small variable-leaf clasping largeleaf	<i>Potamogeton</i> spp. <i>P. nodosus</i> <i>P. zosteriformis</i> <i>P. foliosus</i> <i>P. illinoensis</i> <i>P. pusillus</i> <i>P. gramineus</i> <i>P. diversifolius</i> <i>P. perfoliatus</i> <i>P. amplifolius</i>	50 to 100	
Pondweed, curlyleaf	<i>Potamogeton crispus</i>	50	
Pondweed, sago	<i>Potamogeton pectinatus</i> (<i>Stuckenia pectinatus</i>)	100	See Special Weed Control for application directions.
Spikerush	<i>Eleocharis</i> spp.	200	Apply as a submerged spot treatment, concentrating the application in the area of the spikerush. If emerged, then spot treat with 2% Clearcast® herbicide by volume at 50 GPA, or 1% at 100 GPA.
Variable-leaf milfoil	<i>Myriophyllum heterophyllum</i>	100 to 200	
Water stargrass	<i>Heteranthera dubia</i>	100	
Widgeon grass	<i>Ruppia maritima</i>	200	

Special Weed Control

Eurasian watermilfoil. Apply **Clearcast** at 100 to 200 ppb to actively growing plants early in the growing season. Applications made to mature milfoil (vegetation topped out) may require multiple applications.

Hydrilla. Apply **Clearcast** at 150 to 200 ppb to actively growing plants early in the growing season. Applications made prior to topped-out hydrilla may require repeat application.

A single application of 50 to 75 ppb can be used to suppress and growth-regulate hydrilla for up to 10 to 12 weeks. If desired, an additional 50 to 75 ppb can be applied to extend the period of growth suppression when normal hydrilla growth resumes.

Sago pondweed. Sago pondweed may be controlled in nonflowing water with water-injected applications at 100 ppb. In dry ditches (drainage and irrigation), sago pondweed may be controlled or growth suppressed with soil-applied **Clearcast** at 64 fl ozs/A. In irrigation canals, apply **Clearcast** after drawdown and prior to water recharge.

Terrestrial Use Directions

Clearcast® herbicide may be applied with ground and aerial equipment including both fixed wing aircraft and helicopter. Applications may be made using foliar broadcast spray, foliar spot spray, injection (hack and squirt), frill and girdle, cut stump, or basal methods.

BROADCAST SPRAY APPLICATION. DO NOT apply more than 64 fl ozs **Clearcast** per acre.

FOLIAR SPOT APPLICATION. Apply **Clearcast** as a percent solution, containing up to 5% **Clearcast** by volume.

INJECTION (HACK AND SQUIRT), FRILL AND GIRDLE, AND CUT STUMP APPLICATION. Treatments may be made using up to 100% **Clearcast** by volume.

BASAL APPLICATION. Treatments can be made using up to 25% **Clearcast** by volume. Basal applications require the use of a good emulsion system to maintain **Clearcast** in a stable emulsion with the penetrating agent being used.

All foliar applications of **Clearcast** require the use of a spray adjuvant. Refer to **SPRAY ADJUVANTS** section for additional information.

Managing Off-target Movement

The information that follows is general guidance for managing and minimizing off-target exposure of this product. Specific use recommendations in this label may vary from these general guidelines depending on the application method and objectives and should supersede the general information provided below.

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related factors determines the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications:

1. The distance of the outermost nozzles on the boom must not exceed 3/4 the length of the wingspan or 90% of the rotor.
2. Nozzles must always point backward parallel with the airstream and never be pointed downward more than 45 degrees.
3. **DO NOT** apply if wind speed is greater than 10 mph, except when making injection or subsurface applications to water.

Where states have more stringent regulations, they must be observed.

The applicator must be familiar with and take into account the information covered in the aerial drift reduction advisory information presented below.

Information On Droplet Size

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential but will not prevent drift if applications are made improperly or under unfavorable environmental conditions (see **Wind; Temperature and Humidity; and Temperature Inversions**).

Controlling droplet size:

- **Volume.** Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure. DO NOT** exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of Nozzles.** Use the minimum number of nozzles that provides uniform coverage.
- **Nozzle Orientation.** Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is recommended practice. Significant deflection from the horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type.** Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid-stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length

For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or 90% of rotor length may further reduce drift without reducing swath width.

Application Height

Applications must not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the upwind and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller droplets, etc.).

Wind

Drift potential is lowest between wind speeds of 2 to 10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential.

NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity

When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions

Applications must not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light, variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light-to-no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas

The pesticide must only be applied when the potential for drift to adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, or crops) is minimal (e.g. when wind is blowing away from the sensitive areas).

Applicator is responsible for any loss or damage which results from spraying **Clearcast® herbicide** in a manner other than recommended in this label. In addition, applicator must follow all applicable state and local regulations and ordinances in regard to spraying.

Clearcast® herbicide may be used for the control of the following plant species. **Clearcast** may be effective for the control or suppression of additional plant species not listed below. The use of **Clearcast** for the control or suppression of undesirable plants not listed below may be done at the discretion of the user.

To the extent consistent with applicable law, the user assumes responsibility for any lack of control or suppression associated with application to weeds not listed on this label.

Weeds Controlled

Common Name	Scientific Name	Rate	Comments
Alligator weed	<i>Alternanthera philoxeroides</i>	64 fl ozs/A Foliar	Addition of glyphosate will improve efficacy.
Annual ryegrass	<i>Lolium multiflorum</i>	16 to 32 fl ozs/A Foliar	
Brazilian pepper; Christmasberry	<i>Schimus terebinthifolius</i>	2% v/v Foliar	
California bullrush	<i>Schoenoplectus californicus</i>	64 fl ozs/A Foliar	
Camphor tree	<i>Cinnamomum camphora</i>	2% v/v Foliar	
Cattail	<i>Typha</i> spp.	32 to 64 fl ozs/A Foliar	
Chinese tallowtree; Popcorn tree	<i>Sapium sebiferum</i>	32 to 64 fl ozs/A Foliar	See Special Weed Control section.
Giant ragweed*	<i>Ambrosia trifida</i>	32 to 64 fl ozs/A Foliar	
Jamaican nightshade	<i>Solanum jamaicense</i>	2% v/v Foliar	
Japanese stiltgrass	<i>Microstegium vimineum</i>	32 to 64 fl ozs/A Foliar	Use MSO at 1% by spray volume. Clearcast will provide some residual control of subsequent seedling emergence.
Johnsongrass, seedling rhizome	<i>Sorghum halepense</i>	16 fl ozs/A Foliar 32 to 64 fl ozs/A Foliar	
Old world climbing fern	<i>Lygodium microphyllum</i>	5% v/v Foliar	
Phragmites	<i>Phragmites australis</i>	64 fl ozs/A Foliar	Use 1 qt/A methylated seed oil (MSO); apply in late vegetative stage up to killing frost. May also be applied as a spot treatment using 1% to 2% Clearcast per spray volume. Older stands of phragmites and stands growing in water may be more difficult to control and will require follow-up applications.
Purple loosestrife	<i>Lythrum salicaria</i>	32 to 64 fl ozs/A Foliar	
Sedge*, purple yellow	<i>Cyperus rotundus</i> <i>Cyperus esculentus</i>	32 fl ozs/A Foliar 32 fl ozs/A Foliar	
Smartweed	<i>Polygonum</i> spp.	32 to 64 fl ozs/A Foliar	
Spike rush	<i>Eleocharis</i> spp.	64 fl ozs/A Foliar	
Taro	<i>Taro</i> spp.	64 fl ozs/A Foliar 5% v/v Foliar	
Tropical soda apple	<i>Solanum viarum</i>	2% v/v Foliar	

(continued)

Weeds Controlled *(continued)*

Common Name	Scientific Name	Rate	Comments
Water primrose	<i>Ludwigia</i> spp.	32 to 64 fl ozs/A Foliar	Addition of glyphosate will improve efficacy.
Wetland nightshade	<i>Solanum tampicense</i>	2% v/v Foliar	
Whitetop; Hoary cress	<i>Cardaria draba</i>	8 to 16 fl ozs/A Foliar	
* Suppression of larger, well-established plants			

In general, the use of methylated seed oil (MSO) at 1% v/v will provide the best control with foliar applications.

Special Weed Control

Chinese tallowtree. Clearcast® herbicide at 32 to 64 fl ozs/A or 0.5 to 2.0% v/v may be applied as a foliar application for selective control of Chinese tallowtree in and around tolerant hardwood species. Chinese tallowtree will be controlled with foliar applications using aerial, handgun, or backpack application methods. When treating Chinese tallowtree in mixed stands of hardwoods, application method and spray volume should ensure adequate coverage of targeted Chinese tallowtree plants. Methylated seed oil should be added at 32 fl ozs/A for broadcast applications, or at 1% v/v for spot backpack and handgun applications. Tolerant hardwood species may exhibit varying degrees of leaf discoloration and temporary injury.

Conditions of Sale and Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and must be followed carefully. However, it is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or use of the product in a manner inconsistent with its labeling, all of which are beyond the control of BASF CORPORATION ("BASF") or the Seller. To the extent consistent with applicable law, all such risks shall be assumed by the Buyer.

BASF warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks, referred to above.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BASF MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS OR MERCHANTABILITY OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BUYER'S EXCLUSIVE REMEDY AND BASF'S EXCLUSIVE LIABILITY, WHETHER IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY, OR OTHERWISE, SHALL BE LIMITED TO REPAYMENT OF THE PURCHASE PRICE OF THE PRODUCT.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BASF AND THE SELLER DISCLAIM ANY LIABILITY FOR CONSEQUENTIAL, EXEMPLARY, SPECIAL OR INDIRECT DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT.

BASF and the Seller offer this product, and the Buyer and User accept it, subject to the foregoing **Conditions of Sale and Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of BASF.

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BASF Corporation
26 Davis Drive
Research Triangle Park, NC 27709


The Chemical Company

Safety Data Sheet

CLEARCAST HERBICIDE

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1. Identification

Product identifier used on the label

CLEARCAST HERBICIDE

Recommended use of the chemical and restriction on use

Recommended use: herbicide

* The "Recommended use" identified for this product is provided solely to comply with a US Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:
BASF CORPORATION
100 Park Avenue
Florham Park, NJ 07932, USA

Telephone: +1 973 245-6000

Emergency telephone number

CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP (4357)

Other means of identification

Substance number:	136003
EPA Register number:	241-437
Molecular formula:	C ₁₅ H ₁₈ N ₃ O ₄ . N H(4)
Chemical family:	imidazole derivative
Synonyms:	ammonium salt of imazamox

2. Hazards Identification

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Classification of the product

No need for classification according to GHS criteria for this product.

Label elements (Emergency overview)

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The product does not require a hazard warning label in accordance with GHS criteria.

Hazards not otherwise classified

Labeling of special preparations (GHS):

The following percentage of the mixture consists of components(s) with unknown hazards regarding the acute toxicity: 0 - 2 % dermal

The following percentage of the mixture consists of components(s) with unknown hazards regarding the acute toxicity: 0 - 2 % oral

The following percentage of the mixture consists of components(s) with unknown hazards regarding the acute toxicity: 15 - 18 % Inhalation - vapour

The following percentage of the mixture consists of components(s) with unknown hazards regarding the acute toxicity: 15 - 18 % Inhalation - mist

Emergency overview

According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

CAUTION:

HARMFUL IF ABSORBED THROUGH SKIN.

HARMFUL IF INHALED.

KEEP OUT OF REACH OF CHILDREN.

KEEP OUT OF REACH OF DOMESTIC ANIMALS.

Avoid contact with the skin, eyes and clothing.

Avoid inhalation of mists/vapours.

3. Composition / Information on Ingredients

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Content (W/W)</u>	<u>Chemical name</u>
247057-22-3	12.1 %	ammonium salt of imazamox (active ingredient)

According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Content (W/W)</u>	<u>Chemical name</u>
247057-22-3	12.1 %	ammonium salt of imazamox (active ingredient)
	87.9 %	Proprietary ingredients

4. First-Aid Measures

Description of first aid measures

General advice:

First aid providers should wear personal protective equipment to prevent exposure. Remove contaminated clothing. Move person to fresh air. If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or physician for treatment advice. Have the product container or label with you when calling a poison control center or doctor or going for treatment.

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If inhaled:

Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary.

If on skin:

Rinse skin immediately with plenty of water for 15 - 20 minutes.

If in eyes:

Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing.

If swallowed:

Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

Most important symptoms and effects, both acute and delayed

Symptoms: No significant reaction of the human body to the product known.

Indication of any immediate medical attention and special treatment needed

Note to physician

Treatment: Symptomatic treatment (decontamination, vital functions).

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
foam, dry powder, carbon dioxide, water spray

Special hazards arising from the substance or mixture

Hazards during fire-fighting:
carbon monoxide, carbon dioxide, nitrogen oxide, nitrogen dioxide, Ammonium, Hydrocarbons,
If product is heated above decomposition temperature, toxic vapours will be released. The substances/groups of substances mentioned can be released in case of fire.

Advice for fire-fighters

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:

Evacuate area of all unnecessary personnel. Contain contaminated water/firefighting water. Do not allow to enter drains or waterways.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Take appropriate protective measures. Clear area. Shut off source of leak only under safe conditions. Extinguish sources of ignition nearby and downwind. Ensure adequate ventilation. Wear suitable personal protective clothing and equipment.

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Environmental precautions

Do not discharge into the subsoil/soil. Do not discharge into drains/surface waters/groundwater. Contain contaminated water/firefighting water.

Methods and material for containment and cleaning up

Dike spillage. Pick up with suitable absorbent material. Place into suitable containers for reuse or disposal in a licensed facility. Spilled substance/product should be recovered and applied according to label rates whenever possible. If application of spilled substance/product is not possible, then spills should be contained, solidified, and placed in suitable containers for disposal. After decontamination, spill area can be washed with water. Collect wash water for approved disposal.

7. Handling and Storage

Precautions for safe handling

RECOMMENDATIONS ARE FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS. PESTICIDE APPLICATORS & WORKERS must refer to the Product Label and Directions for Use attached to the product for Agricultural Use Requirements in accordance with the EPA Worker Protection Standard 40 CFR part 170. Ensure adequate ventilation. Provide good ventilation of working area (local exhaust ventilation if necessary). Keep away from sources of ignition - No smoking. Keep container tightly sealed. Protect contents from the effects of light. Protect against heat. Protect from air. Handle and open container with care. Do not open until ready to use. Once container is opened, content should be used as soon as possible. Avoid aerosol formation. Avoid dust formation. Provide means for controlling leaks and spills. Do not return residues to the storage containers. Follow label warnings even after container is emptied. The substance/ product may be handled only by appropriately trained personnel. Avoid all direct contact with the substance/product. Avoid contact with the skin, eyes and clothing. Avoid inhalation of dusts/mists/vapours. Wear suitable personal protective clothing and equipment.

Protection against fire and explosion:

The relevant fire protection measures should be noted. Fire extinguishers should be kept handy. Avoid all sources of ignition: heat, sparks, open flame. Sources of ignition should be kept well clear. Avoid extreme heat. Keep away from oxidizable substances. Electrical equipment should conform to national electric code. Ground all transfer equipment properly to prevent electrostatic discharge. Electrostatic discharge may cause ignition.

Conditions for safe storage, including any incompatibilities

Segregate from incompatible substances. Segregate from foods and animal feeds. Segregate from textiles and similar materials.

Further information on storage conditions: Keep only in the original container in a cool, dry, well-ventilated place away from ignition sources, heat or flame. Protect containers from physical damage. Protect against contamination. The authority permits and storage regulations must be observed.

Storage stability:

If substance/product crystallizes, thaw at room temperature.

Protect from temperatures below: 0 °C

Changes in the properties of the product may occur if substance/product is stored below indicated temperature for extended periods of time.

Protect from temperatures above: 40 °C

Changes in the properties of the product may occur if substance/product is stored above indicated temperature for extended periods of time.

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8. Exposure Controls/Personal Protection

Users of a pesticidal product should refer to the product label for personal protective equipment requirements.

Advice on system design:

Whenever possible, engineering controls should be used to minimize the need for personal protective equipment.

Personal protective equipment

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

Respiratory protection:

Wear respiratory protection if ventilation is inadequate. Wear a NIOSH-certified (or equivalent) TC23C Chemical/Mechanical type filter system to remove a combination of particles, gas and vapours. For situations where the airborne concentrations may exceed the level for which an air purifying respirator is effective, or where the levels are unknown or Immediately Dangerous to Life or Health (IDLH), use NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions.

Hand protection:

Chemical resistant protective gloves, Protective glove selection must be based on the user's assessment of the workplace hazards.

Eye protection:

Safety glasses with side-shields. Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:

Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

General safety and hygiene measures:

Wear long sleeved work shirt and long work pants in addition to other stated personal protective equipment. Work place should be equipped with a shower and an eye wash. Handle in accordance with good industrial hygiene and safety practice. Personal protective equipment should be decontaminated prior to reuse. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks). Take off immediately all contaminated clothing. Store work clothing separately. Hands and/or face should be washed before breaks and at the end of the shift. No eating, drinking, smoking or tobacco use at the place of work. Keep away from food, drink and animal feeding stuffs.

9. Physical and Chemical Properties

Form:	liquid	
Odour:	acidic, mild	
Odour threshold:	No data available.	
Colour:	pale yellow, clear	
pH value:	approx. 5 - 7	(20 °C)
Freezing point:	approx. 0 °C	(1,013.3 hPa) Information applies to the solvent.
Boiling point:	approx. 100 °C	(1,013.3 hPa) Information applies to the solvent.

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Flash point:		A flash point determination is unnecessary due to the high water content.
Flammability:	Based on the structure or composition there is no indication of flammability	
Lower explosion limit:		As a result of our experience with this product and our knowledge of its composition we do not expect any hazard as long as the product is used appropriately and in accordance with the intended use.
Upper explosion limit:		As a result of our experience with this product and our knowledge of its composition we do not expect any hazard as long as the product is used appropriately and in accordance with the intended use.
Autoignition:		Based on the water content the product does not ignite.
Vapour pressure:	approx. 23.3 hPa	(20 °C) Information applies to the solvent.
Density:	1.0486 g/cm3 8.7510 Lb/USg	(20 °C) (68 °F)
Vapour density:		not applicable
Partitioning coefficient n-octanol/water (log Pow):		not applicable
Thermal decomposition:	carbon monoxide, carbon dioxide, nitrogen oxide, nitrogen dioxide, Ammonium, Hydrocarbons	
Viscosity, dynamic:	3.7 mPa.s	(20 °C)
Solubility in water:		soluble
Other Information:	If necessary, information on other physical and chemical parameters is indicated in this section.	

10. Stability and Reactivity

Reactivity

Additional information:
No hazardous reactions if stored and handled as prescribed/indicated.

Corrosion to metals:
Corrosive effects to metal are not anticipated.

Oxidizing properties:
Not an oxidizer.

Chemical stability

The product is stable if stored and handled as prescribed/indicated.

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Possibility of hazardous reactions

Hazardous reactions:

The product is chemically stable.

No hazardous reactions if stored and handled as prescribed/indicated.

Conditions to avoid

Conditions to avoid:

Avoid all sources of ignition: heat, sparks, open flame. Avoid electro-static charge. Avoid prolonged storage. Avoid contamination. Avoid prolonged exposure to extreme heat. Avoid extreme temperatures.

Incompatible materials

Substances to avoid:

oxidizing agents

Hazardous decomposition products

Decomposition products:

Hazardous decomposition products: No hazardous decomposition products if stored and handled as prescribed/indicated.

Thermal decomposition:

Possible thermal decomposition products:

carbon monoxide, carbon dioxide, nitrogen oxide, nitrogen dioxide, Ammonium, Hydrocarbons

Stable at ambient temperature. If product is heated above decomposition temperature toxic vapours may be released. If product is heated above decomposition temperature hazardous fumes may be released.

11. Toxicological information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity

Assessment of acute toxicity:

Relatively nontoxic after single ingestion. Slightly toxic after short-term skin contact. Relatively nontoxic after short-term inhalation.

Oral

Type of value: LD50

Species: rat

Value: > 5,000 mg/kg

Inhalation

Type of value: LC50

Species: rat

Value: > 5 mg/l

Exposure time: 4 h

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Dermal

Type of value: LD50
Species: rat
Value: > 4,000 mg/kg

Irritation / corrosion

Assessment of irritating effects:
May cause slight irritation to the skin. May cause moderate but temporary irritation to the eyes.

Skin

Species: rabbit
Result: non-irritant

Eye

Species: rabbit
Result: non-irritant

Sensitization

Assessment of sensitization:
There is no evidence of a skin-sensitizing potential.
modified Buehler test
Species: guinea pig
Result: Skin sensitizing effects were not observed in animal studies.

Chronic Toxicity/Effects

Repeated dose toxicity

Assessment of repeated dose toxicity: The product has not been tested. The statement has been derived from the properties of the individual components. No substance-specific organotoxicity was observed after repeated administration to animals.

Genetic toxicity

Assessment of mutagenicity: The product has not been tested. The statement has been derived from the properties of the individual components. Mutagenicity tests revealed no genotoxic potential.

Carcinogenicity

Information on: imazamox

Assessment of carcinogenicity: In long-term studies in rats and mice in which the substance was given by feed, a carcinogenic effect was not observed.

Reproductive toxicity

Assessment of reproduction toxicity: The product has not been tested. The statement has been derived from the properties of the individual components. The results of animal studies gave no indication of a fertility impairing effect.

Information on: imazamox

Assessment of reproduction toxicity: The results of animal studies gave no indication of a fertility impairing effect.

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Teratogenicity

Assessment of teratogenicity: The product has not been tested. The statement has been derived from the properties of the individual components. Animal studies gave no indication of a developmental toxic effect at doses that were not toxic to the parental animals.

Information on: imazamox

Assessment of teratogenicity: No indications of a developmental toxic / teratogenic effect were seen in animal studies.

Other Information

Misuse can be harmful to health.

Symptoms of Exposure

No significant reaction of the human body to the product known.

12. Ecological Information

Toxicity

Aquatic toxicity

Assessment of aquatic toxicity:

There is a high probability that the product is not acutely harmful to aquatic organisms.

Aquatic plants

EC50 (72 h) > 100 mg/l (growth rate), *Pseudokirchneriella subcapitata* (OECD Guideline 201, static)

Toxicity to fish

Information on: imazamox

LC50 (96 h) > 119 mg/l, *Lepomis macrochirus*

Aquatic invertebrates

Information on: imazamox

Aquatic plants

Information on: imazamox

EC50 (72 h) 29.1 mg/l (growth rate), *Pseudokirchneriella subcapitata*

EC50 (7 d) 0.031 mg/l (growth rate), *Lemna gibba*

Assessment of terrestrial toxicity

With high probability not acutely harmful to terrestrial organisms.

Other terrestrial non-mammals

Information on: imazamox

LC50, *Anas platyrhynchos*

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LD50 > 100 ug/bee, Apis mellifera

Persistence and degradability

Assessment biodegradation and elimination (H2O)

The product has not been tested. The statement has been derived from the properties of the individual components.

Elimination information

Not readily biodegradable (by OECD criteria).

Assessment biodegradation and elimination (H2O)

Information on: imazamox

Bioaccumulative potential

Assessment bioaccumulation potential

The product has not been tested. The statement has been derived from the properties of the individual components.

Mobility in soil

Assessment transport between environmental compartments

The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: imazamox

*The substance will not evaporate into the atmosphere from the water surface.
Following exposure to soil, the product trickles away and can - dependant on degradation - be transported to deeper soil areas with larger water loads.*

Additional information

Other ecotoxicological advice:

The ecological data given are those of the active ingredient. Do not release untreated into natural waters.

13. Disposal considerations

Waste disposal of substance:

Pesticide wastes are regulated. Improper disposal of excess pesticide, spray mix or rinsate is a violation of federal law. If pesticide wastes cannot be disposed of according to label instructions, contact the State Pesticide or Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container disposal:

Rinse thoroughly at least three times (triple rinse) in accordance with EPA recommendations. Consult state or local disposal authorities for approved alternative procedures such as container recycling. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

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RCRA:

This product is not regulated by RCRA.

14. Transport Information

Land transport

USDOT

Not classified as a dangerous good under transport regulations

Sea transport

IMDG

Not classified as a dangerous good under transport regulations

Air transport

IATA/ICAO

Not classified as a dangerous good under transport regulations

15. Regulatory Information

Federal Regulations

Registration status:

Crop Protection TSCA, US released / exempt

Chemical TSCA, US blocked / not listed

EPCRA 311/312 (Hazard categories): Not hazardous;

State regulations

CA Prop. 65:

There are no listed chemicals in this product.

Labeling requirements under FIFRA

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label.

CAUTION:

HARMFUL IF ABSORBED THROUGH SKIN.

HARMFUL IF INHALED.

KEEP OUT OF REACH OF CHILDREN.

KEEP OUT OF REACH OF DOMESTIC ANIMALS.

Avoid contact with the skin, eyes and clothing.

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Wash thoroughly after handling.

16. Other Information

SDS Prepared by:

BASF NA Product Regulations

SDS Prepared on: 2014/02/28

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

IMPORTANT: WHILE THE DESCRIPTIONS, DESIGNS, DATA AND INFORMATION CONTAINED HEREIN ARE PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE , IT IS PROVIDED FOR YOUR GUIDANCE ONLY. BECAUSE MANY FACTORS MAY AFFECT PROCESSING OR APPLICATION/USE, WE RECOMMEND THAT YOU MAKE TESTS TO DETERMINE THE SUITABILITY OF A PRODUCT FOR YOUR PARTICULAR PURPOSE PRIOR TO USE. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS. IN NO CASE SHALL THE DESCRIPTIONS, INFORMATION, DATA OR DESIGNS PROVIDED BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE. FURTHER, YOU EXPRESSLY UNDERSTAND AND AGREE THAT THE DESCRIPTIONS, DESIGNS, DATA, AND INFORMATION FURNISHED BY OUR COMPANY HEREUNDER ARE GIVEN GRATIS AND WE ASSUME NO OBLIGATION OR LIABILITY FOR THE DESCRIPTION, DESIGNS, DATA AND INFORMATION GIVEN OR RESULTS OBTAINED, ALL SUCH BEING GIVEN AND ACCEPTED AT YOUR RISK.
END OF DATA SHEET



Clipper® HERBICIDE



For the management of undesirable aquatic vegetation in slow moving or quiescent waters

Active Ingredient	By Wt.
*Flumioxazin	51%
Other Ingredients	49%
Total	100%
*2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isoin-dole-1,3(2H)-dione	

Clipper® Herbicide is a water dispersible granule containing 51% active ingredient.

EPA Reg. No. 59639-161 EPA Est. 11773-IA-01

KEEP OUT OF REACH OF CHILDREN CAUTION

SEE BELOW FOR ADDITIONAL PRECAUTIONARY STATEMENTS.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS & DOMESTIC ANIMALS CAUTION

Harmful if inhaled or absorbed through the skin. Causes moderate eye irritation. Avoid breathing dust and spray mist. Avoid contact with skin, eyes or clothing.

FIRST AID

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 on skin or clothing:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

(continued)

FIRST AID (continued)

If in eyes:

- Hold eye open and rinse slowly and gently with water for 15-20 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 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.

HOT LINE NUMBER

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact **1-800-892-0099** for emergency medical treatment information.

PERSONAL PROTECTIVE EQUIPMENT (PPE):

Some of the materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category A on an EPA chemical-resistance category selection chart.

Applicators and other handlers must wear: long-sleeved shirt and long pants, chemical-resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride, shoes and socks.

Follow manufacturer's instructions for cleaning/maintaining PPE. If there are no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

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.

ENVIRONMENTAL HAZARDS

If not used in accordance with directions on the label, this product can be toxic to non-target plants and aquatic invertebrates. Do not apply to water except as specified on the label. Drift and runoff may be hazardous to non-target plants and aquatic organisms in neighboring areas, if not used in accordance to label directions. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water when disposing of equipment washwaters.

This pesticide is toxic to plants and should be used strictly in accordance with the drift and runoff precautions on this label in order to minimize off-site exposures.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

READ ENTIRE LABEL. USE STRICTLY IN ACCORDANCE WITH PRECAUTIONARY STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the treatment area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

DISCLAIMER, RISKS OF USING THIS PRODUCT, LIMITED WARRANTY AND LIMITATION OF LIABILITY

IMPORTANT: Read the entire Label including this Disclaimer, Risks of Using this Product, Limited Warranty, and Limitation of Liability before using this product. If the terms are not acceptable THEN DO NOT USE THE PRODUCT; rather, return the unopened product within 15 days of purchase for a refund of the purchase price.

RISKS OF USING THIS PRODUCT

The Buyer and User (referred to collectively herein as "Buyer") of this product should be aware that there are inherent unintended risks associated with the use of this product which are impossible to eliminate. These risks include, but are not limited to, injury to plants and crops to which this product is applied, lack of control of the target pests or weeds, resistance of the target pest or weeds to this product, injury caused by drift, and injury to rotational crops caused by carryover in the soil. If the Buyer chooses not to accept these risks, THEN THIS PRODUCT SHOULD NOT BE APPLIED. By applying this product Buyer acknowledges and accepts these inherent unintended risks AND TO THE FULLEST EXTENT ALLOWED BY LAW, AGREES THAT ALL SUCH RISKS ASSOCIATED WITH THE APPLICATION AND USE ARE ASSUMED BY THE BUYER.

Valent shall not be responsible for losses or damages resulting from use of this product in any manner not set forth on the label. Buyer assumes all risks associated with the use of this product in any manner or under conditions not specifically directed or approved on the label.

(continued)

(continued)

LIMITED WARRANTY

Valent warrants only that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the label, under average use conditions, when used strictly in accordance with the label and subject to the Risks of Using This Product as described above. To the extent consistent with applicable law AND AS SET FORTH ABOVE, VALENT MAKES NO OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED. No agent or representative of Valent or Seller is authorized to make or create any other express or implied warranty.

LIMITATION OF LIABILITY

To the fullest extent allowed by law, Valent or Seller is not liable for any incidental, consequential, indirect or special damages resulting from the use or handling of this product. TO THE FULLEST EXTENT ALLOWED BY LAW, THE EXCLUSIVE REMEDY OF THE BUYER, AND THE EXCLUSIVE MAXIMUM LIABILITY OF VALENT OR SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT SHALL BE THE RETURN OF THE PURCHASE PRICE OF THIS PRODUCT OR, AT THE ELECTION OF VALENT OR SELLER, THE REPLACEMENT OF THE PRODUCT.

PROMPT NOTICE OF CLAIM

To the extent consistent with applicable law allowing such requirements Valent must be provided notice as soon as Buyer has reason to believe it may have a claim, but in no event later than twenty-one days from the date of application so that an immediate inspection of the affected property can be made.

To the extent consistent with applicable law if Buyer does not notify Valent of any claims, in such period, it shall be barred from obtaining any remedy.

NO AMENDMENTS

Valent and Seller offer this product, and Buyer accepts it, subject to the foregoing **Disclaimer, Risks of Using This Product, Limited Warranty** and **Limitation of Liability**, which may not be modified by any oral or written agreement.

TANK MIXES

NOTICE: Tank mixing or use of this product with any other product which is not specifically and expressly authorized by the label shall be the exclusive risk of user, applicator and/or application advisor, to the extent allowed by applicable law.

Read and follow the entire label of each product to be used in the tank mix with this product.

PRODUCT INFORMATION

Clipper Herbicide is a fast acting contact herbicide that controls selected submersed, emergent and floating aquatic weeds. It is most effective when applied to young, actively growing weeds in water with a pH of less than 8.5.

Clipper Herbicide may be applied to the following quiescent or slow moving bodies of water:

- Bayous
- Canals
- Drainage ditches
- Lakes
- Marshes
- Ponds (including golf course ponds)
- Reservoirs

Application of *Clipper* Herbicide to public aquatic areas may require special approval and/or permits. Consult with local state agencies, if required.

IRRIGATION RESTRICTIONS FOLLOWING APPLICATION

Application Method	Application Rate	Water Depth	Turf and Landscape Ornamentals	Ornamentals Grown for Production in Greenhouse and Nursery
Surface Spray	6 to 12 oz per surface acre	Greater than 3 feet	None	5 days
		Less than 3 feet	12 hours	5 days
Subsurface	Less than 200 ppb	N/A	1 day	5 days
	200 to 300 ppb	N/A	2 days	5 days
	300 to 400 ppb	N/A	3 days	5 days

RESISTANCE MANAGEMENT

Clipper Herbicide is a Group 14 herbicide. Any weed population may contain or develop plants that are resistant to *Clipper* Herbicide and other Group 14 herbicides. Weed species with acquired resistance to Group 14 herbicides may eventually dominate the weed population if Group 14 herbicides are used repeatedly in the same water body or in successive years as the primary method of control for targeted species. This may result in partial or total loss of control of those species by *Clipper* Herbicide or other Group 14 herbicides.

To delay or prevent herbicide resistance consider the following recommendations:

- Avoid the consecutive use of *Clipper* Herbicide or other herbicides that have a similar target site of action.
- Alternate herbicides used for aquatic weed control.
- Base herbicide use on a comprehensive Integrated Pest Management (IPM) program.
- Monitor treated weed populations for loss of efficacy.
- Contact your local extension specialist, other experts appropriate to aquatic use, and/or manufacturer for resistance and/or integrated weed management recommendations.

For further information or to report suspected resistance, you may contact Valent U.S.A. Corporation at the following toll-free number: 800-89-VALENT (898-2536).

USE PRECAUTIONS AND RESTRICTIONS

- Do not apply to intertidal or estuarine areas.
- There is no post-application holding restriction against use of treated water for drinking or recreational purposes (e.g. swimming, fishing).
- In areas with dense weed vegetation only treat 1/2 the water body at one time and wait 10-14 days before treating the remaining area. Do not re-treat the same section of water within 28 days of application.
- Treated water may not be used for irrigation purposes on food crops until at least five (5) days after application.
- Treated water may be used for irrigation purposes on turf and landscape ornamentals as outlined in the *Irrigation Restrictions Following Application* table.
- Do not use in water utilized for crawfish farming.
- Do not re-treat the same section of water with *Clipper* Herbicide more than 6 times per year.
- Do not exceed 400 ppb of *Clipper* Herbicide during any one application.

SPRAY DRIFT MANAGEMENT FOR FOLIAR OR SURFACE APPLICATIONS

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather-related factors determine the potential for spray drift. The applicator is responsible for considering all these factors when making decisions.

Do not spray *Clipper* Herbicide under circumstances where spray droplets may drift on to unprotected persons, or plantings of food, forage or crops that might be damaged, or rendered unfit for sale, use or consumption. These precautions are not applicable for subsurface injection by closed systems.

- Use the largest droplet size consistent with acceptable efficacy. Formation of very small droplets may be minimized by appropriate nozzle selection, by orienting nozzles away from the air stream as much as possible and by avoiding excessive spray boom pressure. For ground boom and aerial applications, use medium or coarser spray nozzles according to ASAE 572 definition for standard nozzles or a volume mean diameter (VMD) of 300 microns or greater for spinning atomizer nozzles.
- Make aerial, ground or watercraft-based applications when wind velocity favors on-target product deposition. Apply only when the wind speed is less than or equal to 10 mph.

- Do not make aerial or ground applications into areas of temperature inversions. Inversions are characterized by stable air and increasing temperatures with increasing distance above the ground. Mist or fog may indicate the presence of an inversion in humid areas. Where permissible by local regulations, the applicator may detect the presence of an inversion by producing smoke and observing a smoke layer near the ground surface.
- Low humidity and high temperatures increase the evaporation rate of spray droplets, and therefore the likelihood of increased spray drift. Avoid spraying during conditions of low humidity and/or high temperatures.

Properly maintain and calibrate all aerial, ground and water based application equipment.

Where states have more stringent regulations, they should be observed.

APPLICATION AND SPRAYER INFORMATION

Mixing Instructions

- Mix with water having pH of 5 to 7. If pH is higher than 7, use an appropriate buffer to reduce pH to desirable range.
- Fill clean spray tank 1/2 full of desired level with water and add buffering agent if necessary.
- Add the required amount of *Clipper* Herbicide to the spray tank while agitating.
- Fill spray tank to desired level with water. Ensure that *Clipper* Herbicide is thoroughly mixed before making applications. Agitation should continue until spray solution has been applied.
- Mix only the amount of spray solution that can be applied the day of mixing. Apply *Clipper* Herbicide within 12 hours of mixing.

ADDITIVES

When applying *Clipper* Herbicide to the foliage of floating or emerged aquatic weeds, mix with an adjuvant approved for use in aquatic sites. Valent recommends the use of a Chemical Producers and Distributors Association certified adjuvant. Mix *Clipper* Herbicide with a non-ionic surfactant containing at least 80% active ingredient. Follow adjuvant manufacturer's label rates. Mixing compatibility should be verified by a jar test before using.

Jar Test to Determine Compatibility of Adjuvants and *Clipper* Herbicide

Conduct a jar test before mixing commercial quantities of *Clipper* Herbicide, when using for the first time, when using new adjuvants or when a new water source is being used.

1. Add 1 pt of water to a quart jar. The water should be from the same source and have the same temperature as the water used in the spray tank mixing operation.
2. Add 3 grams (approximately 1 level tsp) of *Clipper* Herbicide for the 8 oz/A rate or 4 grams (approximately 1-1/2 tsp) for 12 oz/A rate to the jar. Gently mix until product disperses.

3. Add 60 ml (4 Tbsp or 2 fl oz) of additive to the quart jar and gently mix.
4. Place cap on jar, invert 10 times, let stand for 15 minutes, evaluate.
5. An ideal tank mix combination will be uniform and free of suspended particles. If any of the following conditions are observed the choice of adjuvant should be questioned:
 - a) Layer of oil or globules on the solution surface.
 - b) Flocculation: Fine particles in suspension or as a layer on the bottom of the jar.
 - c) Clabbering: Thickening texture (coagulated) like gelatin.

Sprayer Cleanup

If spray equipment is dedicated to application of aquatic herbicides, the following steps are recommended to clean the spray equipment:

- Completely drain the spray tank and rinse the application equipment thoroughly, including the inside and outside of the tank and all in-line screens.

If spray equipment will be used for purposes other than applying aquatic herbicides, it must be thoroughly cleaned following application of *Clipper* Herbicide. The following steps must be used to clean the spray equipment:

1. Completely drain the spray tank and rinse the application equipment thoroughly, including the inside and outside of the tank and all in-line screens.
2. Fill the tank with clean water and flush all hoses, booms, screens and nozzles.
3. Top off tank with clean water.
4. Circulate through sprayer for 5 minutes.
5. Then flush all hoses, booms, screens and nozzles for a minimum of 15 minutes.
6. Drain tank completely.
7. Remove all nozzles and screens and rinse them with clean water.

AERIAL APPLICATION

To obtain satisfactory weed control, aerial application of *Clipper* Herbicide, must provide uniform coverage of surface weeds and sufficient contact time. When applied by air, *Clipper* Herbicide may not provide adequate control of some submersed weeds. Do not apply by air when significant drift on to non-target plants may occur or when wind velocity is more than 10 mph. Avoid spraying *Clipper* Herbicide within 200 feet of dwellings, adjacent sensitive crops or environmentally sensitive areas. To obtain satisfactory application and avoid drift, the following directions must be observed:

Volume and Pressure

Apply *Clipper* Herbicide in 5 gals of water per acre, with a maximum spray pressure of 40 PSI. Application at less than 5 gals per acre may not provide adequate weed control. Higher gallonage applications generally provide more consistent weed control.

Nozzles and Nozzle Operation

Use nozzles that produce flat or hollow cone spray patterns. Use non-drip type nozzles such as dia-

phragm type nozzles to avoid unwanted discharge of spray solution. The nozzle must be directed toward the rear of the aircraft, at an angle between 0° and 15° downward. Do not place nozzles on the outer 25% of the wings or rotors.

Adjuvants

Refer to the additive section or the tank mix partners label for adjuvant recommendation.

DIRECTIONS FOR USE TO CONTROL FLOATING AND EMERGED WEEDS USING SURFACE APPLICATION

Clipper Herbicide will control weeds and algae listed in Table 1, *Floating and Emerged Weeds* when applied as a broadcast spray with appropriate equipment. For best results, apply *Clipper* Herbicide to the foliage of actively growing weeds.

Table 1. Floating and Emerged Weeds

Common Name	Scientific Name
Alligator Weed	<i>Alternanthera philoxeroides</i>
Duckweed	<i>Lemna</i> spp.
Frog's-bit	<i>Limnobium spongia</i>
Water Fern	<i>Salvinia</i> spp.
Water Lettuce	<i>Pistia stratiotes</i>
Watermeal	<i>Wolffia</i> spp.
Water Pennywort	<i>Hydrocotyle</i> spp.
Filamentous algae	<i>Pithophora</i>
Filamentous algae	<i>Cladophora</i>

Surface Application

Apply *Clipper* Herbicide as a broadcast spray at 6 to 12 ounces of formulated product per acre plus an adjuvant approved for use in aquatics.

Clipper Herbicide is a contact herbicide that quickly degrades in the water column so plants that do not initially come in contact with the herbicide will not be controlled. Apply *Clipper* Herbicide in a minimum of 30 gals of water per acre to all areas of the water body where weeds exist. Coverage is essential for effective control as all floating weeds need to be exposed to lethal concentrations in all parts of the water body. Any untreated escapes or re-introductions of plants that were not treated will reestablish in areas where surface weeds had previously been controlled. If a second application is required to provide control, it is recommended that a treatment be made once the return of these weeds is first observed, but no sooner than 28 days after the last treatment.

Application of *Clipper* Herbicide during early morning hours may enhance weed control. When applying to densely packed actively growing surface weeds, ensure adequate coverage. Rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation. If aquatic vegetation is dense, treat floating surface weeds in sections to avoid a rapid decrease in dissolved oxygen.

Clipper Herbicide may be tank mixed with 2,4-D, diquat, glyphosate or other registered foliar applied herbicides for enhanced control of floating and emergent weeds.

Consult a manufacturer's label for specific rate restrictions and weeds controlled. Always follow the most restrictive label restrictions and precautions for all products used when making an application involving tank mixes.

Application Equipment

Apply *Clipper* Herbicide with sprayers equipped with nozzles designed to deliver the desired spray pressure and spray volume. Apply by backpack or hand-gun sprayer, airboat, helicopter, airplane or other application equipment that will ensure thorough coverage of target plant foliage.

DIRECTIONS FOR USE TO CONTROL SUBMERSED AND FLOATING WEEDS USING SUBSURFACE APPLICATION

Clipper Herbicide will control submersed and floating weeds listed in Table 2, *Submersed and Floating Weeds Controlled by Subsurface Application*, when applied subsurface with appropriate equipment.

Table 2. Submersed and Floating Weeds Controlled by Subsurface Application

Common Name	Scientific Name
Coontail	<i>Ceratophyllum demersum</i>
Duckweed	<i>Lemna</i> spp.
Fanwort	<i>Cabomba caroliniana</i>
Hydrilla	<i>Hydrilla verticillata</i>
Nygron	<i>Najas guadalupensis</i>
Pondweed, Curlyleaf	<i>Potamogeton crispus</i>
Pondweed, Sago	<i>Potamogeton pectinatus</i>
Pondweed, Variable-Leaf	<i>Potamogeton diversifolius</i>
Water Fern	<i>Salvinia</i> spp.
Water Lettuce	<i>Pistia stratiotes</i>
Watermeal	<i>Wolffia</i> spp.
Watermilfoil, Eurasian	<i>Myriophyllum spicatum</i>
Watermilfoil, Variable-Leaf	<i>Myriophyllum heterophyllum</i>

Subsurface Application

Apply *Clipper* Herbicide at a rate that will produce an initial concentration of 200 to 400 ppb (of active ingredient flumioxazin) in the water column.

Clipper Herbicide is rapidly absorbed by target plants, but also breaks down quickly in water with a pH greater than 8.5. The pH of water surrounding mats of submersed vegetation can exceed 8.5 by early to mid-day, due to photosynthetic processes. Application of *Clipper* Herbicide under these conditions may provide only partial weed control, and regrowth is likely. For best control, apply *Clipper* Herbicide in a minimum of 30 gals of water per acre in the early morning to actively growing weeds and early in the

season before surface matting occurs. Complete coverage and sufficient contact time of submersed weeds with *Clipper* Herbicide is required for optimal performance. Application of *Clipper* Herbicide with subsurface trailing hoses designed to distribute the herbicide within the plant stand will provide more effective and longer term control of submersed weeds. Use Table 3, Subsurface Application Rates to determine the amount of *Clipper* Herbicide needed to achieve desired concentration at different water depths. Use higher concentrations when weed biomass is heavy and/or weeds are more mature and topped out. Any untreated plants that are left in the water column can re-infest treated areas that had previously been controlled. If a second application is required to provide control, it is recommended that a treatment be made once the return of these weeds is first observed, but no sooner than 28 days after the last treatment.

When applying *Clipper* Herbicide to densely packed actively growing submersed weeds, a rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation. If aquatic vegetation is dense, treat submersed weeds in sections to avoid a rapid decrease in dissolved oxygen.

Clipper Herbicide may be tank mixed with other registered submersed applied herbicides for enhanced control of submersed and floating weeds.

Application Equipment

To improve distribution in the water column and ensure adequate coverage, apply *Clipper* Herbicide with subsurface trailing hoses in order to place

the herbicide under the surface and throughout the biomass of aquatic vegetation. Keep swath width to a minimum in order to maximize contact with submersed aquatic vegetation.

Information on Hydrilla Control in Florida

Clipper Herbicide should be applied as a subsurface treatment for hydrilla control. For best control of hydrilla apply during the late Winter/early Spring and/or early to late Fall. Efficacy of *Clipper* Herbicide will be enhanced at these timings due to lower potential biomass present and lower pH of the water. If applied to mature topped out hydrilla, *Clipper* Herbicide will cause some discoloration and loss of growing tips, but regrowth will be rapid.

Tank mixing *Clipper* Herbicide with other registered herbicides is recommended, especially if hydrilla is approaching maturity or biomass is heavy.

Table 3. Subsurface Application Rates

Water Depth (feet)	Pounds of <i>Clipper</i> Herbicide required per surface acre to achieve desired water concentration		
	200 ppb	300 ppb	400 ppb
1	1.1	1.6	2.1
2	2.1	3.2	4.2
3	3.2	4.8	6.4
4	4.2	6.4	8.5
5	5.3	8.0	10.6
6	6.4	9.5	12.7
7	7.4	11.1	14.8

Example: to achieve an initial concentration of 200 ppb of flumioxazin in a 4 foot deep water column, apply 4.2 lbs of *Clipper* Herbicide per surface acre.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage, disposal or cleaning of equipment.

PESTICIDE STORAGE

Keep pesticide in original container.

Store in a cool, dry, secure place.

Do not put formulation or dilute spray solution into food or drink containers.

Do not contaminate food or foodstuffs.

Do not store or transport near feed or food.

Not for use or storage in or around the home.

For help with any spill, leak, fire or exposure involving this material, call day or night **(800) 892-0099**.

PESTICIDE DISPOSAL

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER HANDLING

Nonrefillable container. Do not reuse or refill the container. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration.

Clipper and *Products That Work, From People Who Care* are registered trademarks of Valent U.S.A. Corporation

Manufactured for:

Valent U.S.A. Corporation

P.O. Box 8025

Walnut Creek CA 94596-8025

Made in U.S.A.

Form 1791-B

EPA Reg. No. 59639-161

EPA Est. 11773-IA-01

Information contained in this booklet is accurate at the time of printing. Since product testing is a continuous process, please read and follow the directions on the product label for the most current directions and precautionary statements.

Always check with your state to verify state registration status or call 800-89-VALENT (898-2536).



For state registration and/or supplemental labels, please call or visit us online.

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Always read and follow label instructions.

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Material Safety Data Sheet

Clipper™ Herbicide

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Clipper™ Herbicide
VC NUMBER(S): 1420
PRODUCT CODE: Not Established.
EPA REGISTRATION NUMBER: 59639-161

PRODUCT DESCRIPTION: Herbicide

MANUFACTURER/DISTRIBUTOR

VALENT U.S.A. CORPORATION
P.O. Box 8025
1600 Riviera Avenue, Suite 200
Walnut Creek, CA 94596-8025.

EMERGENCY TELEPHONE NUMBERS

HEALTH EMERGENCY OR SPILL (24 hr.):
(800) 892-0099
TRANSPORTATION (24 hr.): CHEMTREC
(800) 424-9300 or (202) 483-7616.

PRODUCT INFORMATION

PROFESSIONAL PRODUCTS: (800) 898-2536 .

The current MSDS is available through our website (www.valent.com), or by calling the product information numbers listed above.

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW.

- CAUTION**
- Harmful if inhaled or absorbed through skin.
 - Avoid breathing dust or spray mist
 - Avoid contact with eyes, skin and clothing
 - May cause moderate eye irritation
 - Keep out of reach of children

POTENTIAL HEALTH EFFECTS

Acute Toxicity (Primary Routes of Exposure): None known.

Acute Eye Contact: Based on an evaluation of the ingredients and/or similar products, this product may cause brief and/or minor eye irritation. The expected adverse health effects resulting from an exposure may include redness and possible swelling.

Acute Skin Contact: Based on an evaluation of the ingredients and/or similar products, this product may cause brief and/or minor skin irritation. The expected adverse health effects resulting from an exposure may include redness and possibly some minor swelling. This product may be slightly toxic when absorbed through the skin. This product is not expected to cause allergic skin reactions.

Acute Ingestion: Based on an evaluation of the ingredients and/or similar products, this product may be minimally toxic when ingested.

Acute Inhalation: Based on an evaluation of the ingredients and/or similar products, this product is expected to be slightly toxic when inhaled. Exposure to high concentrations of dust may result in respiratory irritation. Signs and symptoms may include, but not be limited to, nasal discharge, sore throat, coughing and difficulty in breathing.

Emergency Telephone: (800) 892-0099.
REVISION NUMBER: 3

MSDS NO.: 0381
REVISION DATE: 11/11/2010

Chronic Toxicity (including cancer): Repeated exposures to Flumioxazin Technical in animals have produced anemia and other blood formation changes, organ weight changes and changes in blood chemistry. Flumioxazin Technical did not produce cancer in life-time feeding studies in laboratory animals.

Developmental Toxicity (birth defects): Birth defects were produced in the offspring of female rats exposed to Flumioxazin Technical. No effects were observed in rabbits.

Reproductive Toxicity: Reproductive effects were observed in rats exposed to Flumioxazin Technical.

Signs and Symptoms of Systemic Effects: No signs or symptoms occurred in animals exposed to high oral or dermal doses of Flumioxazin Technical. Exposure to very high concentrations of Flumioxazin Technical in the air resulted in breathing difficulties, decreased activity and some changes in the tissues of the respiratory system.

Potentially Aggravated Medical Conditions: Individuals with anemia or preexisting diseases of the blood may have increased susceptibility to the toxicity of excessive exposures.

For complete discussion of the toxicology data from which this evaluation was made, refer to Section 11. For Ecotox/Environmental Information, refer to Section 12. For Regulatory Information, refer to Section 15.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Weight/ Percent	Purpose
Flumioxazin (2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isoindole-1,3(2H)-dione).	103361-09-7	45 - 55	Active Ingredient
Kaolin clay.	1332-58-7	11 - 21	Carrier
Others (including particulates not otherwise classified).	No CAS#	24 - 40	-

Other ingredients, which are maintained as trade secrets, are any substances other than an active ingredient contained in this product. Some of these may be hazardous, but their identities are withheld because they are considered trade secrets. The hazards associated with the other ingredients are addressed in this document. Specific information on other ingredients for the management of exposures, spills, or safety assessments can be obtained by a treating physician or nurse by calling **(800) 892-0099** at any time.

4. FIRST AID MEASURES

EMERGENCY NUMBER (800) 892-0099

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact **1-800-892-0099** for emergency medical treatment information.

EYE CONTACT:

Hold eye open and rinse slowly and gently with water for 15-20 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.

SKIN CONTACT:

Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

INGESTION:

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.

INHALATION:

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

NOTES TO PHYSICIAN:

None.

5. FIRE FIGHTING MEASURES

FLASH POINT:	Not applicable.	
AUTOIGNITION:	No data available	
EXTINGUISHING MEDIA:	Water fog, carbon dioxide, foam, dry chemical	
FLAMMABLE LIMITS IN AIR - LOWER (%):		Not applicable
FLAMMABLE LIMITS IN AIR - UPPER (%):		Not applicable

NFPA RATING:

Health:	1
Flammability:	1
Reactivity:	0
Special:	None

(Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using professional judgement. Values were not available in the guidelines or published evaluations prepared by the National Fire Protection Association, NFPA.

FIRE FIGHTING INSTRUCTIONS: Products of combustion from fires involving this material may be toxic. Avoid breathing smoke and mists. Avoid personnel and equipment contact with fallout and runoff. Minimize the amount of water used for fire fighting. Do not enter any enclosed area without full protective equipment, including self-contained breathing equipment. Contain and isolate runoff and debris for proper disposal. Decontaminate personal protective equipment and fire fighting equipment before reuse.

HAZARDOUS DECOMPOSITION PRODUCTS: Normal combustion forms carbon dioxide, water vapor and may produce: Oxides of nitrogen . Combustion may produce toxic gases of: Nitrogen compounds, Fluorine compounds. Incomplete combustion can produce carbon monoxide.

6. ACCIDENTAL RELEASE MEASURES

VALENT EMERGENCY PHONE NUMBER: (800) 892-0099

CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300

OBSERVE PRECAUTIONS IN SECTION 8: PERSONAL PROTECTION

Stop the source of the spill if safe to do so. Contain the spill to prevent further contamination of the soil, surface water, or ground water. For additional spill response information refer to the North American Emergency Response Guidebook.

UN/NA NUMBER: Not applicable. **EMERGENCY RESPONSE GUIDEBOOK NO.:** Not applicable.

FOR SPILLS ON LAND:

CONTAINMENT: Reduce airborne dust. Avoid runoff into storm sewers or other bodies of water.

CLEANUP: Clean up spill immediately. Vacuum or sweep up material and place in a chemical waste container. Wash area with soap and water. Pick up wash liquid with additional absorbent and place in a chemical waste container.

FOR SPILLS IN WATER:

CONTAINMENT: This material will disperse or dissolve in water. Stop the source of the release. Contain and isolate to prevent further release into soil, surface water and ground water.

CLEANUP: Clean up spill immediately. Absorb spill with inert material. Remove contaminated water for treatment or disposal.

7. HANDLING AND STORAGE

END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

HANDLING:

Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove contaminated clothing and shoes immediately. Then wash thoroughly and put on clean clothing.

STORAGE:

Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Keep pesticide in original container only. Store in a cool, dry place. Do not put formulation or dilute spray solution into food or drink containers. Do not store or transport near food or feed. Do not contaminate food or foodstuffs. Not for use or storage in or around the home.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

EYES & FACE: Do not get this material in your eyes. Eye contact can be avoided by wearing protective eyewear.

RESPIRATORY PROTECTION: Use this material only in well ventilated areas. Unless ventilation is adequate to keep airborne concentrations below recommended exposure standards, approved respiratory protection should be worn.

This material may be a respiratory irritant and, unless ventilation is adequate, the use of approved respiratory protection is recommended. Use this material only in well ventilated areas.

SKIN & HAND PROTECTION: Avoid contact with skin or clothing. Skin contact should be minimized by wearing protective clothing including gloves.

EXPOSURE LIMITS

Chemical Name	ACGIH Exposure Limits	OSHA Exposure Limits	Manufacturer's Exposure Limits
Flumioxazin (2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isoindole-1,3(2H)-dione).	None.	None.	None.
Kaolin clay.	2 mg/m ³ TWA (respirable fraction)	15 mg/m ³ TWA 5 mg/m ³ TWA	None
Others (including particulates not otherwise classified).	None.	None.	None.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM:	Granule
COLOR:	Light brown
ODOR:	Slight
FLASH POINT:	Not applicable.
MELTING POINT:	Not applicable
BULK DENSITY:	0.49 g/cc (30.8 lb./cu. ft.)
pH:	5.4 @ 25°C (1% suspension)
CORROSION CHARACTERISTICS:	Not corrosive to containers.
SOLUBILITY:	Dispersible in water

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:	This material is considered chemically and thermally stable.
INCOMPATIBILITY:	May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

10. STABILITY AND REACTIVITY

OXIDATION/REDUCTION PROPERTIES:	Not an oxidizing or reducing agent.
EXPLODABILITY:	Not expected to be explosive.
HAZARDOUS DECOMPOSITION PRODUCTS:	Normal combustion forms carbon dioxide, water vapor and may produce: Oxides of nitrogen . Combustion may produce toxic gases of: Nitrogen compounds, Fluorine compounds. Incomplete combustion can produce carbon monoxide.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

Oral Toxicity LD ₅₀ (rats).	> 5,000 mg/kg	EPA Tox Category	IV
Dermal Toxicity LD ₅₀ (rabbits).	> 2,000 mg/kg	EPA Tox Category	III
Inhalation Toxicity LC ₅₀ (rats).	0.969 mg/L	EPA Tox Category	III
Eye Irritation (rabbits).	Brief and/or minor irritation	EPA Tox Category	III
Skin Irritation (rabbits).	Brief and/or minor irritation	EPA Tox Category	IV
Skin Sensitization (guinea pigs).	Non-sensitizer	EPA Tox Category	Not applicable

CARCINOGEN CLASSIFICATION

TOXICITY OF FLUMIOXAZIN TECHNICAL

SUBCHRONIC: Compound related effects of Flumioxazin Technical noted in rats following subchronic exposures at high dose levels were hematotoxicity including anemia, and increases in liver, spleen, heart, kidney and thyroid weights. In dogs, the effects produced at high dose levels included a slight prolongation in activated partial thromboplastin time, increased cholesterol and phospholipid, elevated alkaline phosphatase, increased liver weights and histological changes in the liver. The lowest no-observable-effect-level (NOEL) in subchronic studies was 30 ppm in the three-month toxicity study in rats.

CHRONIC/CARCINOGENICITY: In a one year dog feeding study, Flumioxazin Technical produced treatment-related changes in blood chemistry and increased liver weights at 100 and 1000 mg/kg/day. Minimal treatment-related histological changes were noted in the livers of animals in the 1000 mg/kg/day group. Based on these data the NOEL is 10 mg/kg/day. Dietary administration of Flumioxazin Technical for 18 months produced liver changes in mice of the 3000 and 7000 ppm groups. There was no evidence of any treatment-related oncogenic effect. The NOEL for this study is 300 ppm. Dietary administration of Flumioxazin Technical for 24 months produced anemia and chronic nephropathy in rats of the 500 and 1000 ppm groups. The anemia lasted throughout the treatment period, however, it was not progressive nor aplastic in nature. No evidence of an oncogenic effect was observed. The NOEL for this study is 50 ppm.

DEVELOPMENTAL TOXICITY: Flumioxazin Technical produces developmental toxicity in rats in the absence of maternal toxicity at doses of 30 mg/kg/day by the oral route and 300 mg/kg/day by the dermal route. The developmental effects noted consisted primarily of decreased number of live fetuses and fetal weights, cardiovascular abnormalities, wavy ribs and decreased number of ossified sacrococcygeal vertebral bodies. The developmental NOEL in the rat oral and dermal developmental toxicity studies were 10 and 100 mg/kg/day, respectively. The response in rabbits was very different from that in rats. No developmental toxicity was noted in rabbits at doses up to 3000 mg/kg/day, a dose well above the maternal NOEL of 1000 mg/kg/day.

REPRODUCTION: Reproductive toxicity was observed in F1 males, P1 females and F1 females at 300 ppm Flumioxazin Technical, the highest dose tested and a dose that also produced signs of systemic toxicity. Toxicity was also observed in the F1 and F2 offspring at doses of 200 ppm and greater.

MUTAGENICITY: Flumioxazin Technical was not mutagenic in most *in vitro* assays: gene mutation and a chromosome aberration assay in the absence of metabolic activation. In three *in vivo* assays, chromosome aberration, unscheduled DNA synthesis and micronucleus assay, Flumioxazin Technical was not mutagenic. The only positive response was observed in the *in vitro* chromosome aberration assay in the presence of metabolic activation. Overall, Flumioxazin Technical does not present a genetic hazard.

For a summary of the potential for adverse health effects from exposure to this product, refer to Section 2. For information regarding regulations pertaining to this product, refer to Section 15.

12. ECOLOGICAL INFORMATION

AVIAN TOXICITY: Based upon EPA designation, Flumioxazin Technical is practically non-toxic to avian species. The following results were obtained from studies with Flumioxazin Technical:

Oral LD₅₀ bobwhite quail: greater than 2250 mg/kg
Dietary LC₅₀ bobwhite quail: greater than 5620 ppm
Dietary LC₅₀ mallard duck: greater than 5620 ppm.

Flumioxazin Technical in the diet. In mallard ducks, a slight, but not statistically significant reduction in hatchlings and 14-day old survivors was observed. Based on a possible, slight effect on egg production at 500 ppm, the NOEL for this study was 250 ppm. No reproductive effects were observed in bobwhite quail exposed to 500 ppm of Flumioxazin technical in the diet.

AQUATIC ORGANISM TOXICITY: Based upon EPA designation, Flumioxazin Technical is slightly to moderately toxic to freshwater fish; moderately toxic to freshwater invertebrates; moderately toxic to estuarine/marine fish and moderately to highly toxic estuarine/marine invertebrates, based on the following tests:

96-hour LC₅₀ rainbow trout: 2.3 mg/L
96-hour LC₅₀ bluegill sunfish: greater than 21 mg/L
48-hour LC₅₀ Daphnia magna: 5.5 mg/L
96-hour LC₅₀ sheepshead minnow: greater than 4.7 mg/L
96-hour (shell deposition) EC₅₀ eastern oyster: 2.8 mg/L
96-hour LC₅₀ mysid shrimp: 0.23 mg/L
Fish early life-stage (rainbow trout): NOEC >7.7 µg/L, <16 µg/L
Chronic toxicity (mysid shrimp): NOEC >15 µg/L, <27 µg/L
Chronic toxicity (Daphnia magna): NOEC >52 µg/L, <99 µg/L.

OTHER NON-TARGET ORGANISM TOXICITY: Flumioxazin Technical is practically non-toxic to bees. The acute contact LC50 in bees was greater than 105 µg/bee.

13. DISPOSAL CONSIDERATIONS

END USERS MUST DISPOSE OF ANY UNUSED PRODUCT AS PER THE LABEL RECOMMENDATIONS.

PRODUCT DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Non-refillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse as follows: Empty the remaining contents into mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution for 30 seconds. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

DISPOSAL METHODS: Check government regulations and local authorities for approved disposal of this material. Dispose in accordance with applicable laws and regulations.

14. TRANSPORT INFORMATION

UN/NA NUMBER:	Not applicable.
DOT (ground) SHIPPING NAME:	Herbicide, solid, non-regulated
TECHNICAL NAME (hazardous material):	Not applicable.
HAZARD CLASS:	Not applicable.
PACKING GROUP:	Not applicable.
DOT REPORTABLE QUANTITY (RQ):	None
REMARKS:	None
EXEMPTION REQUIREMENT:	None.
EMERGENCY RESPONSE GUIDEBOOK NO.:	Not applicable.
MARINE POLLUTANT:	Not applicable.

15. REGULATORY INFORMATION

PESTICIDE REGULATIONS: All pesticides are governed under FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act). Therefore, the regulations presented below are pertinent only when handled outside of the normal use and applications of pesticides. This includes waste streams resulting from manufacturing/formulation facilities, spills or misuse of products, and storage of large quantities of products containing hazardous or extremely hazardous substances.

U.S. FEDERAL REGULATIONS:

Ingredients in this product are reviewed against an inclusive list of federal regulations. Therefore, the user should consult appropriate authorities. The federal regulations reviewed include: Clean Water Act, SARA, CERCLA, RCRA, DOT, TSCA and OSHA. If no components or information is listed in the space below this paragraph, then none of the regulations reviewed are applicable.

SARA (311, 312):

Immediate Health:	Yes.
Chronic Health:	Yes.
Fire:	No
Sudden Pressure:	No
Reactivity:	No

STATE REGULATIONS:

Each state may promulgate standards more stringent than the federal government. This section cannot encompass an inclusive list of all state regulations. Therefore, the user should consult state or local authorities. The state regulations reviewed include: California Proposition 65, California Directors List of Hazardous Substances, Massachusetts Right to Know, Michigan Critical Materials List, New Jersey Right to Know, Pennsylvania Right to Know, Rhode Island Right to Know and the Minnesota Hazardous Substance list. For Washington State Right to Know, see Section 8 for Exposure Limit information. For Louisiana Right to Know refer to SARA information listed under U.S. Regulations above. If no components or information is listed in the space below this paragraph, then none of the regulations reviewed are applicable.

Flumioxazin (2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isoindole-1,3(2H)-dione).

California Proposition 65	Not Listed
NJ Right To Know	Listed

Kaolin clay.

MA Right To Know	Listed
PA Right To Know	Listed
RI Right To Know	Listed
MN Hazardous Substance	Listed

For information regarding potential adverse health effects from exposure to this product, refer to Sections 2 and 11.

16. OTHER INFORMATION

REASON FOR ISSUE:	Added the EPA registration number. Added container disposal information.
MSDS NO.:	0381
EPA REGISTRATION NUMBER:	59639-161
REVISION NUMBER:	3
REVISION DATE:	11/11/2010
SUPERCEDES DATE:	March 4, 2009
RESPONSIBLE PERSON(S):	Valent U.S.A. Corporation, Corporate EH&S, (925) 256-2803.

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-APPROVED 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 is regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling. 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-approved label.

The information in this MSDS is based on data available to us as of the revision date given herein, and believed to be correct. Contact Valent U.S.A. Corporation to confirm if you have the most current MSDS.

Judgements as to the suitability of information herein for the individual's own use or purposes are necessarily the individual's own responsibility. Although reasonable care has been taken in the preparation of such information, Valent extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the individual's purposes or the consequences of its use.

2010 Valent U.S.A. Corporation

Emergency Telephone:	(800) 892-0099.
REVISION NUMBER:	3

MSDS NO.:	0381
REVISION DATE:	11/11/2010

CUTRINE®-ULTRA

ALGAECIDE/HERBICIDE/CYANOBACTERICIDE

GENERAL INFORMATION

This product is a chelated copper formulation containing an emulsified surfactant/penetrant combination for highly effective control of coarse (thick cell-walled) filamentous algae, mucilaginous (colonial) planktonic algae, Chara and copper-sensitive vascular aquatic plants. This product controls Planktonic (suspended) forms such as the Cyanobacteria (*Anabaena*, *Aphanizomenon*, *Microcystis*, *Pseudanabaena*, *Oscillatoria*), Green algae (*Pandorina*, *Volvox*, & *Eudorina*) Golden Algae (*Prymnesium parvum*) and Diatoms (*Achnanthes*, *Chaetoceros*, & *Suriirella*); Filamentous (mat-forming) forms such as *Spirogyra*, *Cladophora*, *Hydrodictyon*, *Vaucheria*, and *Ulothrix*, and attached, Benthic (bottom-growing) attached forms such as *Chara*, *Nitella*, *Gleotrichia* and *Lyngbya*. This product has also been proven effective in controlling the rooted aquatic plant, *Hydrilla verticillata*, *Egeria densa* and other copper-sensitive species. The ethanolamines in this product prevent the precipitation of copper with carbonates and bicarbonates in the water. Waters treated with this product may be used for swimming, fishing, further potable water treatment, livestock watering or irrigating turf, ornamental plants or crops immediately after treatment.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Read entire label and use strictly in accordance with precautionary statements and directions.

GENERAL APPLICATIONS RESTRICTIONS:

(For end-use products in containers ≥ 5 gallons or ≥ 50 pounds.) Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.

(For end-use consumer products in containers less than 5 gallons or less than 50 pounds) Do not apply this product in a way that will contact adults, children, or pets, either directly or through drift. Some states may require permits for the application of this product to public waters. Check with your local authorities.

(For all sizes) Do not enter or allow others to enter until application of product has been completed in the area.

PRE-TREATMENT CONSIDERATIONS:

(For end-use products in containers ≥ 5 gallons or ≥ 50 pounds.) In Potable Water Reservoirs, Lakes, Industrial Ponds & Wastewater or other monitored water systems, make initial product treatment at the onset of nuisance bloom conditions as evidenced by initial taste and odor complaints; high cell counts or chlorophyll a concentrations; high MIB or geosmin concentrations; visible surface scum formations; low Secchi disk readings; significant daily fluctuations in dissolved oxygen; and/or sudden increases in pH. Monitoring of several of these parameters on a regular basis will assist in optimizing the timing of treatments and reducing the amounts of this product needed for seasonal control. Identification of primary nuisance species or genera may also be helpful in determining and refining dosage rates.

(For end-use consumer products in containers < 5 gallons or < 50 pounds) In Ponds (Farm, Fire, Fish, Golf Course, Irrigation, Ornamental, Stormwater Retention, Swimming), Small Lakes, Fish Hatcheries, Aquaculture Facilities), start treatment with this product when visible, actively growing algae and susceptible plants appear in spring, preferably before significant surface accumulations occur. Conduct treatments with operating aeration and/or fountain systems, when available.

SURFACE SPRAY / INJECTION

SLOW-FLOWING OR QUIESCENT WATER BODIES

ALGAECIDE APPLICATION

For effective control, maintain proper chemical concentration for a minimum of three hours contact time. The application rates in the chart are based on static or minimal flow situations. Where significant dilution or loss of water from unregulated inflows or outflows occur (raceways) within a three hour period, chemical may have to be metered in (see FLOWING WATER Directions).

- Identify the form of algae growth present as one of the following types: Planktonic (suspended), Filamentous (mat forming), or Benthic (*Chara/Nitella*) and estimate the density of growth (Low, Medium, High).

- Use **Table 1 - Copper Concentration** to select the desired PPM (Parts per Million) Copper needed, based upon the algal form and density.

Table 1 - Copper Concentration

Form of Algal Growth	Density of Growth		
	Low	Medium	High
Planktonic	0.2	0.4	0.6
Filamentous	0.2	0.6	0.8
Benthic	0.4	0.7	1.0

- Refer to **Table 2 - Product Application Rate** and determine gallons of product needed per Acre-foot corresponding to the desired PPM concentration determined in step #2.

Table 2 - Product Application Rate (Gallons)

PPM Copper	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Gallon per Acre-ft	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0

- Determine acre-feet within the intended treatment area (area of infestation) by measuring length, width plus averaging several depth readings within the treatment area. Use the formula:

$$\frac{\text{Length (ft.)} \times \text{Width (ft.)} \times \text{Avg. Depth (ft.)}}{43,560} = \text{Acre-Feet}$$

- Multiply Acre-Feet calculated in Step #4 times the gallons of this product determined in Step #3 to determine number of gallons of this product required for the intended treatment area.
- Before applying, dilute the required amount of this product with enough water to ensure even distribution with the type of equipment being used. Typical dilution range is 9:1 when using hand-type sprayer or up to 50:1 when using water pump equipment or large tank sprayers.
- Break up floating algae mats manually before spraying or with force of power sprayer if one is used. Use hand or power sprayer adjusted to rain-sized droplets to cover area evenly taking water depth into consideration. If using underwater injection systems such as drop hoses or injection booms, ensure boat pattern is uniform throughout treatment area. Treat shoreline areas first to avoid trapping fish.
- Clean spray equipment by flushing with clean water after treatment and follow **STORAGE AND DISPOSAL** instructions on the label for empty or remaining partial containers.

CUTRINE-PLUS Granular Algaecide may be used as an alternative in low volume flow situations, spot treatments or treatment of bottom-growing algae in deep water.

HERBICIDE APPLICATION

This product controls *Hydrilla verticillata*, *Egeria densa* and other copper-sensitive vascular aquatic plant species can be obtained from copper concentrations of 0.4 to 1.0 ppm resulting from product treatment. Choose the application rate based upon stage and density of plant growth and respective water depth from the chart below.

Application Rates - Gallons/Surface Acre*

Growth/Stage Relative Density	PPM copper	Depth In Feet					
		1	2	3	4	5	6
Early Season Low Density	0.4	1.2	2.4	3.6	4.8	6.0	7.2
	0.5	1.5	3.0	4.5	6.0	7.5	9.0
Mid-Season Moderate Density	0.6	1.8	3.6	5.4	7.2	9.0	10.8
	0.7	2.1	4.2	6.3	8.4	10.5	12.6
Late Season High Density	0.8	2.4	4.8	7.3	9.6	12.0	14.4
	0.9	2.7	5.4	8.1	10.8	13.5	16.2
	1.0	3.0	6.0	9.0	12.0	15.0	18.0

*Application rates for depths greater than six feet may be obtained by adding the rates given for the appropriate combination of depths. Application rates should not result in excess of 1.0 ppm copper concentration within treated water.

FOR USE IN:
LAKES; RIVERS; POTABLE WATER RESERVOIRS; FARM, FIRE, FISH, GOLF COURSE, INDUSTRIAL, IRRIGATION, RECREATIONAL, STORMWATER DETENTION AND WASTEWATER PONDS; FISH HATCHERIES AND RACEWAYS; CROP AND NON-CROP IRRIGATION CONVEYANCE SYSTEMS (DITCHES, CANALS AND LATERALS)

ACTIVE INGREDIENTS:

Copper Ethanolamine Complex, Mixed....27.8%
 (Mono CAS# 14215-52-2 and Tri CAS# 82027-59-6)*

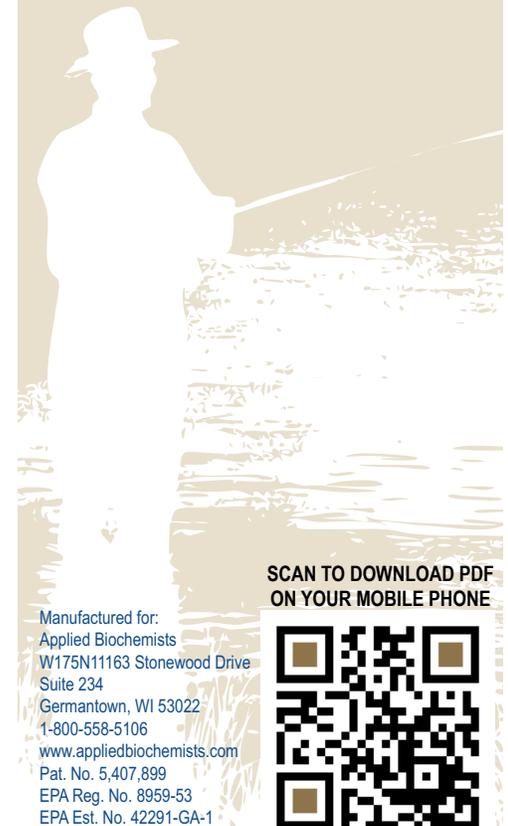
OTHER INGREDIENTS:.....72.2%
TOTAL.....100.0%

*Contains 0.9 lbs. of elemental copper per gallon. Metallic copper equivalent, 9%

KEEP OUT OF REACH OF CHILDREN DANGER PELIGRO

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

See Additional Precautions on Back



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 EPA Reg. No. 8959-53
 EPA Est. No. 42291-GA-1

**FLOWING WATER
DRIP SYSTEM APPLICATION - FOR USE IN POTABLE WATER AND IRRIGATION CONVEYANCE SYSTEMS**

PRE-TREATMENT CONSIDERATIONS

In **Crop and Non-Crop Irrigation Conveyance Systems:** Ditches Canals & Laterals, apply product treatments as soon as algae or aquatic vascular plants begin to interfere noticeably with normal delivery of water (clogging of lateral headgates, suction screens, weed screens and siphon tubes). Delaying treatment could perpetuate the problem causing massing and compacting of plants. Heavy infestations and low flow conditions may require increasing water flow rate during application.

Prior to treatment it is important to accurately determine water flow rates. In the absence of weirs, orifices, or similar devices, which give accurate water flow measurements, volume of flow may be estimated by the following formula:

$$\text{Average Width (feet)} \times \text{Average Depth (feet)} \times \text{Velocity* (feet/second)} \times 0.9 = \text{Cubic Feet per Second (C.F.S.)}$$

*Velocity is the time it takes a floating object to travel a given distance. Dividing the distance traveled (feet) by the time (seconds) will yield velocity (feet/second). Repeat this measurement at the intended application site at least three times, then average the values.

• After accurately determining the water flow rate in C.F.S. or gallons/minute, find the corresponding product drip rate on the chart below.

WATER FLOW RATE		PRODUCT DRIP RATE*		
C.F.S.	Gal/Min	Qts./Hr.	mL/Min.	Fl.Oz./Min.
1	450	1	16	0.5
2	900	2	32	1.1
3	1350	3	47	1.6
4	1800	4	63	2.1
5	2250	5	79	2.7

Calculate the amount of this product needed to maintain the drip rate for a period of 3 hours by multiplying Qts./Hr. x 3; ml/Min. x 180; or Fl. Oz./Min. x 180. Dosage will maintain 1.0 ppm Copper concentration in the treated water for the 3 hour period. Introduce this product into the channel at weirs or other turbulence-creating structures to effectively disperse it.

Pour the required amount of this product into a drum or tank equipped with a brass needle valve and constructed to maintain a constant drip rate. Use a stopwatch and appropriate measuring container to set the desired drip rate. Re-adjust accordingly if flow rate changes during the 3 hour treatment period.

Distance of control obtained down the waterway will vary depending upon density of vegetation growth. Treatment period may have to be extended up to 6 hours in areas where control may be difficult due to high flows or significant growth. Periodic maintenance treatments may be required to maintain seasonal control.

TANK MIXING

On waters where enforcement of use restrictions for recreational, domestic and irrigation uses are acceptable, the following mixture can be used as an alternative Hydrilla control method.

Tank mix 3 gallons of this product with 2 gallons of **HARVESTER®**. Apply mixture at the rate of 5 gallons per surface acre. Dilute with at least 9 parts water and apply as a surface spray or underwater injection. Observe all cautions and restrictions on the labels of both this product and **HARVESTER®** used in this mixture.

OTHER TREATMENT FACTORS AND CONSIDERATIONS

The following suggestions apply to the use of this product as an algacide or herbicide in all approved use sites:

- Calm and sunny conditions when water temperature is at least 60°F will usually expedite control results.
- Treat when growth first begins to appear or create a nuisance, if possible.
- Apply in a manner that will ensure even distribution of the chemical within the treatment area. Effective control of algae requires direct contact with all cells throughout the water column, since these plants do not have vascular systems to transport active ingredient from cell to cell.
- Visible reduction of algae is commonly observed in 24 to 48 hours following application, with full effects of treatments sometimes taking 7 – 10 days depending upon algae forms, weather, degree of infestation and water temperatures.
- Re-treat areas if re-growth or new growth begins to appear and seasonal control is desired. Identify new growth to re-check required copper concentrations that may be needed for control.
- Under conditions of heavy infestation, treat only 1/3 to 1/2 of the water body at a time to avoid fish suffocation caused by oxygen depletion from decaying algae. (See ENVIRONMENTAL HAZARDS).

FIRST AID

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 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 or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

If swallowed: Call a poison control center or doctor immediately for treatment advice. Have the person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a 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 mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling doctor, or going for treatment.

In case of emergency call 1-800-654-6911

For spill or cleanup information call CHEMTREC at 1-800-424-9300

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER / PELIGRO

Corrosive. Causes irreversible eye damage and skin burns. Harmful if swallowed or absorbed through the skin. Do not get in eyes, on skin, or on clothing. Wear protective eyewear, clothing, and chemical resistant gloves. Wash thoroughly with soap and water before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

PERSONAL PROTECTIVE EQUIPMENT (PPE): Mixers, loaders, applicators, and other handlers must wear the following:

- long-sleeve shirt,
- long pants,
- socks plus shoes,
- goggles or face shield and rubber gloves.

User Safety Requirements

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

User Safety Instructions

Users must wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Users must remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Users must remove PPE immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing. Wash outside of gloves before removing.

Potable water sources treated with this copper product may be used as drinking water only after proper additional potable water treatments.

ENVIRONMENTAL HAZARDS:

(For end-use products in containers <5 gallons or <50 pounds): This product may be hazardous to aquatic organisms. This product may be toxic to trout and other species of fish. Fish toxicity is dependent upon the hardness of water. Do not use in water containing trout if the carbonate hardness of water does not exceed 50 ppm. Do not use in waters containing Koi and hybrid goldfish. Not intended for use in small volume, garden pond systems.

(For end-use products in containers ≥5 gallons or ≥50 pounds): Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

Waters treated with this product may be hazardous to aquatic organisms. Treatment of aquatic weeds and algae can result in oxygen loss from decomposition of dead algae and weeds. This oxygen loss can cause fish and invertebrate suffocation.

To minimize this hazard, do not treat more than 1/2 of the water body to avoid depletion of oxygen due to decaying vegetation. Wait at least 10-14 days between treatments. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Consult with the State or local agency with primary responsibility for regulating pesticides before applying to public waters, to determine if a permit is required.

Certain water conditions including low pH (≤ 6.5), low dissolved organic carbon (DOC) levels (3.0 mg/L or lower), and "soft" waters (i.e. alkalinity less than 50 mg/L), increases the potential acute toxicity to non-target aquatic organisms.

STORAGE & DISPOSAL:

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited.

PESTICIDE STORAGE:

(For non-refillable containers only): **Nonrefillable container.** Keep container closed when not in use. Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Do not reuse or refill container. Do not contaminate feed, feedstuffs, or drinking water. Do not store or transport near feed or food. Store at temperatures above 32°F.

(For 275 Gallon refillable container only): **Refillable container.** Keep container closed when not in use. Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Refill this container with CUTRINE®-ULTRA only. Do not reuse this container for any other purpose. Do not contaminate feed, feedstuffs, or drinking water. Do not store or transport near feed or food. Store at temperatures above 32°F.

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional office for guidance.

CONTAINER DISPOSAL:

(For <5 gallon non-refillable containers only): Do not reuse container. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling or reconditioning if available or puncture and dispose of in approved landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. Consult Federal, State or local authorities for approved alternative procedures.

(For ≥5 gallon non-refillable containers only): Do not reuse container. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 with water and recap. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Then offer for recycling or reconditioning if available or puncture and dispose of in approved landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. Consult Federal, State or local authorities for approved alternative procedures.

(For 275 Gallon refillable container only): Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill container about 10 percent full with water. Agitate vigorously or recirculate water with pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat rinsing procedure two more times. Then offer for recycling or reconditioning if available or puncture and dispose of in approved landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. Consult Federal, State or local authorities for approved alternative procedures.

Warranty

To the extent consistent with applicable law neither the manufacturer nor the seller makes any warranty, expressed or implied concerning the use of this product other than indicated on the label.

To the extent consistent with applicable law buyer assumes risk of use of this material when such use is contrary to label instructions. Read and follow the label directions.

Cutrine® and Harvester® are registered trademarks of Arch Chemicals, Inc.



FOR ANY EMERGENCY, 24 HOURS / 7 DAYS, CALL:	1-800-654-6911 (OUTSIDE USA: 1-423-780-2970)
FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC®:	1-800-424-9300 (OUTSIDE USA: 1-703-527-3887)
FOR ALL MSDS QUESTIONS & REQUESTS, CALL:	1-800-511-MSDS (OUTSIDE USA: 1-423-780-2347)

PRODUCT NAME: AB CUTRINE ULTRA

1. PRODUCT AND COMPANY IDENTIFICATION

Supplier
Applied Biochemists (WI)
W175 N11163 Stonewood Drive ,
Suite 234
Germantown, WI, 53022
United States

Telephone: +12622554449
Telefax: +12622554268
Web: www.appliedbiochemists.com

REVISION DATE: 09/20/2011
SUPERCEDES: 02/15/2007

MSDS Number: 000000012519
SYNONYMS:
CHEMICAL FAMILY: None
DESCRIPTION / USE: None established
FORMULA: None established

Manufacturer
Advantis Technologies
1400 Bluegrass Lakes Parkway
Alpharetta, GA 30004
United States of America

2. HAZARDS IDENTIFICATION

OSHA Hazard Classification:	Corrosive to skin, Severe eye irritant
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Routes of Entry: Eyes Skin Ingestion
Chemical Interactions: None known.
Medical Conditions Aggravated: None known.



Human Threshold Response Data

Odor Threshold Not established for product.

Irritation Threshold Not established for product.

Hazardous Materials Identification System / National Fire Protection Association Classifications

<u>Hazard Ratings :</u>	<u>Health</u>	<u>Flammability</u>	<u>Physical / Instability</u>	<u>PPI / Special hazard.</u>
HMIS	3	0	1	
NFPA	3	0	0	

Immediate (Acute) Health Effects

Inhalation Toxicity: Not expected to be an inhalation hazard at ambient conditions. May be harmful if vapors are inhaled. Inhalation of mist or vapor may cause irritation and/or burns to the mucous membranes of the respiratory tract.

Skin Toxicity: Causes skin burns. Not expected to be toxic from dermal contact.

Eye Toxicity: Severe eye irritation Any visual impairment or corneal damage (opacity) would be expected to clear within several days.

Ingestion Toxicity: Harmful if swallowed. Causes digestive tract burns.

Acute Target Organ Toxicity: Corrosive to skin, Severe eye irritant, Inhalation of mist or vapor may cause irritation to the mucous membranes of the respiratory tract.

Prolonged (Chronic) Health Effects

Carcinogenicity: This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA.

Reproductive and Developmental Toxicity: Not known or reported to cause reproductive or developmental toxicity.

Inhalation: There are no known or reported effects from chronic exposure except for effects similar to those experienced from acute exposure.

Skin Contact: There are no known or reported effects from chronic exposure except for effects (if any) similar to those experienced from acute exposure.

Ingestion: There are no known or reported effects from chronic ingestion except for effects similar to those experienced from single exposure. The acute corrosivity of this product, makes chronic ingestion of significant amounts unlikely.

Eye Contact: Prolonged contact may result in more severe irritation.

Sensitization: This material tested negative for skin sensitization in animals.

Chronic Target Organ Toxicity: There are no known or reported target organ effects from chronic exposure.



Supplemental Health Hazard Information : no data available

3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>CAS OR CHEMICAL NAME</u>	<u>CAS #</u>	<u>% RANGE</u>
Triethanolamine	102-71-6	
Ethanolamine	141-43-5	
BASIC COPPER CARBONATE	12069-69-1	
Fatty acids, tall-oil	61790-12-3	

4. FIRST AID MEASURES

General Advice:	Call a poison control center or doctor for treatment advice. For 24-hour emergency medical assistance, call Arch Chemical Emergency Action Network at 1-800-654-6911. Have the product container or label with you when calling a poison control center or doctor, or going for treatment.
Inhalation:	IF INHALED: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.
Skin Contact:	IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
Eye Contact:	IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 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.
Ingestion:	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 a poison control center or doctor. Do not give anything by mouth to an unconscious person.



Notes to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

Flammability Summary (OSHA): The product is not flammable., Not combustible., The substance or mixture is not classified as pyrophoric., Not explosive

Flammable Properties

Fire / Explosion Hazards: Will not burn
Extinguishing Media: Carbon dioxide (CO₂) Dry powder Foam
Fire Fighting Instructions: Use water spray to cool unopened containers. In case of fire, use normal fire-fighting equipment and the personal protective equipment recommended in Section 8 to include a NIOSH approved self-contained breathing apparatus.
Hazardous Combustion Products: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

6. ACCIDENTAL RELEASE MEASURES

Personal Protection for Emergency Situations: Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to boots, impervious gloves, hard hat, splash-proof goggles, impervious clothing, i.e., chemically impermeable suit, self-contained breathing apparatus.

Spill Mitigation Procedures

Air Release: Keep people away from and upwind of spill/leak.
Water Release: If the product contaminates rivers and lakes or drains inform respective authorities.
Land Release: Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). The product should not be allowed to enter drains, water courses or the soil.
Additional Spill Information : Prevent further leakage or spillage if safe to do so. Evacuate personnel to safe areas. Use personal protective equipment as required.



7. HANDLING AND STORAGE

Handling: Do not take internally. Avoid contact with skin, eyes and clothing. Upon contact with skin or eyes, wash off with water. Avoid breathing mist or vapor.

Storage: Store in a cool, dry and well ventilated place. Isolate from incompatible materials.

Incompatible Materials for Storage: Refer to Section 10, "Incompatible Materials."

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation: Local exhaust ventilation or other engineering controls are normally required when handling or using this product to keep airborne exposures below the TLV, PEL or other recommended exposure limit.

Protective Equipment for Routine Use of Product

Respiratory Protection : Wear a NIOSH approved respirator if levels above the exposure limits are possible., A NIOSH approved air purifying respirator with organic vapor cartridge and P95 particulate filter. Air purifying respirators should not be used in oxygen deficient or IDLH atmospheres or if exposure concentrations exceed ten (10) times the published limit.

Skin Protection : Avoid contact with skin. Impervious gloves Boots Apron A full impervious suit is recommended if exposure is possible to a large portion of the body.

Eye Protection: Chemical resistant goggles must be worn. Face-shield

Protective Clothing Type: impervious clothing

General Protective Measures: Ensure that eyewash stations and safety showers are close to the workstation location.

Exposure Limit Data

<u>CHEMICAL NAME</u>	<u>CAS #</u>	<u>Name of Limit</u>	<u>Exposure</u>
Triethanolamine	102-71-6	ACGIH	5 mg/m3 TWA
Ethanolamine	141-43-5	ACGIH	3 ppm TWA
Ethanolamine	141-43-5	ACGIH	6 ppm STEL
Ethanolamine	141-43-5	OSHA Z1	3 ppm TWA 6 mg/m3 TWA



Ethanolamine	141-43-5	NIOSH-IDLH	30 ppm
BASIC COPPER CARBONATE	12069-69-1	ACGIH	1 mg/m3 Calculated as Cu TWA dusts and mists
BASIC COPPER CARBONATE	12069-69-1	OSHA Z1	1 mg/m3 TWA dusts and mists
BASIC COPPER CARBONATE	12069-69-1	NIOSH-IDLH	100 mg/m3

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	liquid
Form	No data.
Color:	No data.
Odor:	No data.
Molecular Weight:	None established
Specific Gravity :	1.2322
	24 °C
pH :	10.2 - 10.3
Boiling Point:	no data available
Freezing Point:	not applicable
Melting Point:	not applicable
Density:	not applicable
Bulk Density:	no data available
Vapor Pressure:	no data available
Vapor Density:	> 1 (Air = 1.0)
Viscosity:	396 mPas 24 °C no data available
Solubility in Water:	completely miscible
Partition coefficient n- octanol/water:	not applicable
Evaporation Rate:	no data available
Oxidizing:	None established
Volatiles, % by vol.:	no data available
VOC Content	no data available
HAP Content	Not applicable

10. STABILITY AND REACTIVITY



Stability and Reactivity Summary: Stable under normal conditions.
Conditions to Avoid: High temperatures
Chemical Incompatibility: Strong acids, Nitrates
Hazardous Decomposition Products: Carbon oxides, nitrogen oxides (NO_x)
Decomposition Temperature: No data

11. TOXICOLOGICAL INFORMATION

Component Animal Toxicology

Oral LD50 value:

Triethanolamine LD50 = 7,390 mg/kg Rat
Ethanolamine LD50 = 1,700 mg/kg rat
BASIC COPPER LD50 = 1,350 mg/kg rat
CARBONATE

Component Animal Toxicology

Dermal LD50 value:

Triethanolamine LD50 > 2,000 mg/kg Rabbit
Ethanolamine LD50 Approximately 1,000 mg/kg rabbit
BASIC COPPER no data available
CARBONATE

Component Animal Toxicology

Inhalation LC50 value:

Triethanolamine A saturated vapor concentration for 8 hours (rats) did not produce any deaths.
Ethanolamine LC50 1 h > 4.8 MG/L mouse
Ethanolamine LC50 4 h > 970 ppm mouse
BASIC COPPER no data available
CARBONATE

Product Animal Toxicity

Oral LD50 value: LD50 = 1,000 mg/kg rat
Dermal LD50 value: LD50 > 2,000 - < 5,000 mg/kg rat
Inhalation LC50 value: LC50 4 h (aerosol), (Whole-body) > 2.07 mg/l rat
Skin Irritation: Corrosive to skin
Eye Irritation: Severe eye irritant
Skin Sensitization: Negative skin sensitizer, guinea pig - Buehler Method



Acute Toxicity: Corrosive to skin Severe eye irritation Inhalation of mist or vapor may cause irritation to the mucous membranes of the respiratory tract.

Subchronic / Chronic Toxicity: Not known or reported to cause subchronic or chronic toxicity.

Reproductive and Developmental Toxicity: Not known or reported to cause reproductive or developmental toxicity.

Triethanolamine This product has been tested and was shown not to produce any adverse effects on reproductive function or fetal development when administered to laboratory animals.

Ethanolamine This chemical has been tested in laboratory animals and no evidence of teratogenicity, embryotoxicity or fetotoxicity was seen.

Mutagenicity: Not known or reported to be mutagenic.

Triethanolamine This chemical has been shown to be non-mutagenic based on a battery of assays.

Ethanolamine This chemical has been tested in a battery of mutagenicity/genotoxicity assays and the results were negative.

Carcinogenicity: This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA.

Triethanolamine The International Agency for Research on Cancer (IARC) has classified this product or a component of this product as a Group 3 substance, Unclassifiable as to Its Carcinogenicity to Humans.

Ethanolamine This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA. Chemicals of similar structure have been shown not to cause cancer in laboratory animals.

12. ECOLOGICAL INFORMATION

Overview: Toxic to fish and other aquatic organisms.

Ecological Toxicity Values for: Triethanolamine

Fathead minnow (Pimephales - (measured, flow-through) 96 h LC50 = 11,800 mg/l promelas),



- Daphnia magna, - (nominal, static). 24 h EC50= 1,850 mg/l
- Common shrimp (Crangon - (nominal, renewal). 48 h LC50> 100 mg/l
crangon)
- Green algae (Scenedesmus - (nominal, static). 48 h EC50 = 750 mg/l
subspicatus)

Ecological Toxicity Values for: Ethanolamine

- Rainbow trout (Oncorhynchus - (nominal, static). 96 h LC50 = 150 mg/l
mykiss)
- Mosquito fish - (nominal, static). 96 h LC50 = 337.5 mg/l
- Bluegill - (nominal, static). 96 h LC50 = 329.16 mg/l
- Fathead minnow (Pimephales - (measured, flow-through) 96 h LC50 = 2,070 mg/l
promelas),
- Goldfish - (measured, static) 96 h LC50 = 170 mg/l
- Daphnia magna (Water flea) - (nominal, static). 24 h LC50= 140 mg/l
- Crangon crangon (shrimp) - (nominal, renewal). 48 h LC50> 100 mg/l
- Brine shrimp - 48 h LC50= 7,100 mg/l
- Daphnia magna (Water flea) - 48 h EC50= 65 mg/l

13. DISPOSAL CONSIDERATIONS

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THE MATERIAL. THE USER OF THE MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

Waste Disposal Summary : If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D.

Disposal Methods : As a nonhazardous liquid waste, it should be disposed of in accordance with local, state and federal regulations.



14. TRANSPORT INFORMATION

Land (US DOT): UN1760 CORROSIVE LIQUID, N.O.S. (COPPER TRIETHANOLAMINE COMPLEX) 8 III

Water (IMDG): UN1760 CORROSIVE LIQUID, N.O.S., (COPPER TRIETHANOLAMINE COMPLEX) 8 III Marine Pollutant: No

Air (IATA): UN1760 CORROSIVE LIQUID, N.O.S., (COPPER TRIETHANOLAMINE COMPLEX) 8 III

Emergency Response Guide Number: ERG # 154

Transportation Notes: Under specific circumstances, this product can ship under two transport exceptions, Limited Quantity or Consumer Commodity. See Bill of Lading for proper shipping description.

EMS: F-A, S-B

15. REGULATORY INFORMATION

UNITED STATES:

Toxic Substances Control Act (TSCA): This is an EPA registered pesticide.
EPA Pesticide Registration Number: None established

FIFRA Listing of Pesticide Chemicals (40 CFR 180): This product is regulated under the Federal Insecticide, Fungicide and Rodenticide Act. It must be used for purposes consistent with its labeling.

Superfund Amendments and Reauthorization Act (SARA) Title III:

Hazard Categories Sections 311 / 312 (40 CFR 370.2):

Health Immediate (Acute) Health Hazard
Physical None

Emergency Planning & Community Right to Know (40 CFR 355, App. A):

Extremely Hazardous Substance Section 302 - Threshold Planning Quantity:

ZUS_SAR302 TPQ (threshold planning quantity) None established

Reportable Quantity (49 CFR 172.101, Appendix):

ZUS_CERCLA Reportable quantity Diethanolamine
Value: 100lbs



ZUS_SAR302 Reportable quantity None established

Supplier Notification Requirements (40 CFR 372.45), 313 Reportable Components

ZUS_SAR313 De minimis concentration Diethanolamine
Value: < 1% by weight

Clean Air Act Toxic ARP Section 112r:

CAA 112R None established

Clean Air Act Socmi:

HON SOC

US. EPA Hazardous Organic NESHP (HON) Synthetic Organic Chemicals (40 CFR 63.100-.106, Table 1)

07 1999

Group I

DIETHANOLAMINE (2,2'-IMINODIETHANOL)

US. EPA Hazardous Organic NESHP (HON) Synthetic Organic Chemicals (40 CFR 63.100-.106, Table 1)

07 1999

Group I

ETHANOLAMINE

US. EPA Hazardous Organic NESHP (HON) Synthetic Organic Chemicals (40 CFR 63.100-.106, Table 1)

07 1999

Group I

TRIETHANOLAMINE

Clean Air Act VOC Section 111:

CAA 111

US. EPA Clean Air Act (CAA) Section 111 SOCMI Intermediate or Final Volatile Organic Compounds (40 CFR 60.489)

01 1996

ETHANOLAMINE

Clean Air Act Haz. Air Pollutants Section 112:

ZUS_CAAHAP None established

ZUS_CAAHRP None established

AB CUTRINE ULTRA

REVISION DATE : 09/20/2011

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CAA AP

US. EPA Hazardous Organic NESHAP (HON) Hazardous Air Pollutants (40 CFR 63.100-.106, Table 2)
04 1999

DIETHANOLAMINE (2,2'-IMINODIETHANOL)

State Right-to-Know Regulations Status of Ingredients

Pennsylvania:

CAS #	COMPONENT NAME
111-42-2	Diethanolamine
141-43-5	Ethanolamine
102-71-6	Triethanolamine

ZUSPA_RTK

Pennsylvania: Hazardous substance list
1989-08-11
ETHANOL, 2,2'-IMINOBIS-
Environmental hazard

Pennsylvania: Hazardous substance list
1989-08-11
ETHANOL, 2-AMINO-

Pennsylvania: Hazardous substance list
1989-08-11
ETHANOL, 2,2',2''-NITRILOTRIS-

New Jersey:

CAS #	COMPONENT NAME
111-42-2	Diethanolamine
141-43-5	Ethanolamine
102-71-6	Triethanolamine

ZUSNJ_RTK

New Jersey Right to Know Hazardous Substance List (RTK-HSL)
2007-03-01
DIETHANOLAMINE ETHANOL, 2,2'-IMINOBIS-
Special Health Hazard - Corrosive

New Jersey Right to Know Hazardous Substance List (RTK-HSL)



693
Diethanolamine

Ingredient Disclosure List (WHMIS)
2007-08-24
Threshold limits: 1 Weight percent
1170
Monoethanolamine

Ingredient Disclosure List (WHMIS)
2007-08-24
Threshold limits: 1 Weight percent
1663
Triethanolamine

Ingredient Disclosure List (WHMIS)
2007-08-24
Threshold limits: 1 Weight percent
985
Copper(II) carbonate hydroxide

16. OTHER INFORMATION

MSDS REVISION STATUS :
SECTIONS REVISED: First formulated version in SAP.
Major References : Available upon request.

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THE INFORMATION IN THIS MSDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. ARCH CHEMICALS BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION BUT, MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MSDS IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT ARCH CHEMICALS MSDS CONTROL AT THE PHONE NUMBER ON THE FRONT PAGE TO MAKE CERTAIN THAT THIS DOCUMENT IS CURRENT. .

Habitat[®] SPECIMEN

herbicide

Applications may only be made for the control of undesirable emergent and floating aquatic vegetation in and around standing and flowing water, including estuarine and marine sites. Applications may be made to control undesirable wetland, riparian and terrestrial vegetation growing in or around surface water when applications may result in inadvertent applications to surface water.

Active ingredient:

Isopropylamine salt of Imazapyr (2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid)*28.7%

Inert ingredients 71.3%

Total100.0%

* Equivalent to 22.6% 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid or 2 pounds acid per gallon.

EPA Reg. No. 241-426

U.S. Patent No. 4,798,619

EPA Est. No.

**KEEP OUT OF REACH OF CHILDREN.
CAUTION/PRECAUCIÓN**

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.)

**In case of an emergency endangering life or property involving this product, call day or night,
800-832-HELP.**

See Next Page for Additional Precautionary Statements

Net contents: _____

FIRST AID	
If on skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact BASF Corporation for emergency medical treatment information: 1-800-832-HELP (4357).	

PRECAUTIONARY STATEMENTS

HAZARD TO HUMANS

CAUTION!

Avoid contact with skin, eyes or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT (PPE):

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category A on an EPA chemical-resistant category selection chart.

Applicators and other handlers must wear:

- Long-sleeve shirt and long pants
- Chemical-resistant gloves, Category A
- shoes plus socks

Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions are given for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

PHYSICAL AND CHEMICAL HAZARDS

Spray solutions of **HABITAT® herbicide** should be mixed, stored and applied only in stainless steel, fiberglass, plastic and plastic-lined steel containers.

DO NOT mix, store or apply **HABITAT** or spray solutions of **HABITAT** in unlined steel (except stainless steel) containers or spray tanks.

ENVIRONMENTAL HAZARDS

DO NOT apply to water except as specified in this label. Treatment of aquatic weeds may result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss may cause the suffocation of some aquatic organisms. Do not treat more than one half of the surface area of the water in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow aquatic organisms to move into untreated areas. Do not contaminate water when disposing of equipment washwaters or rinsate.

This pesticide is toxic to vascular plants and should be used strictly in accordance with the drift precautions on the label.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

HABITAT should be used only in accordance with recommendations on the leaflet label attached to the container. Keep containers closed to avoid spills and contamination.

STORAGE AND DISPOSAL

DO NOT contaminate water, food or feed by storage or disposal.

PESTICIDE STORAGE: DO NOT store below 10° F.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL:

Nonrefillable Container. DO NOT reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

Triple rinse containers small enough to shake

(capacity ≤ 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Triple rinse containers too large to shake (capacity > 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or mix tank. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

IMPORTANT

DO NOT use on food crops. **DO NOT** apply this product within one-half mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within one-half mile of an active potable water intake in a standing body of water, such as a lake, pond or reservoir. **DO NOT** apply to water used for irrigation

except as described in **APPLICATION TO WATERS USED FOR IRRIGATION** section of this label. Keep from contact with fertilizers, insecticides, fungicides and seeds. **DO NOT** drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the treated soil may be washed or moved into contact with their roots. **DO NOT** use on lawns, walks, driveways, tennis courts, or similar areas. **DO NOT** side trim desirable vegetation with this product unless severe injury and plant death can be tolerated. Prevent drift of spray to desirable plants.

Clean application equipment after using this product by thoroughly flushing with water.

GENERAL USE PRECAUTIONS AND RESTRICTIONS

Applications may only be made for the control of undesirable emergent and floating aquatic vegetation in and around standing and flowing water, including estuarine and marine sites. Applications may be made to control undesirable wetland, riparian and terrestrial vegetation growing in or around surface water when applications may result in inadvertent applications to surface water.

Do not apply more than 6 pints of product (1.5 lbs. acid equivalent) per acre per year.

Aerial application is restricted to helicopter only.

Application of **HABITAT® herbicide** can only be made by federal or state agencies, such as Water Management District personnel, municipal officials and the U.S. Army Corps of Engineers, or those applicators who are licensed or certified as aquatic pest control applicators and are authorized by the state or local government.

Treatment to other than non-native invasive species is limited to only those plants that have been determined to be a nuisance by a federal or state government entity.

Applications to private waters: Applications may be made to private waters that are still, such as ponds, lakes and drainage ditches where there is minimal or no outflow to public waters.

Application to public waters: Applications may be made to public waters such as ponds, lakes, reservoirs, marshes, bayous, drainage ditches, canals, streams, rivers, and other slow-moving or quiescent bodies of water for control of aquatic weeds or for control of riparian and wetland weed species.

Consult local state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.

Recreational Use of Water in Treatment Area: There are no restrictions on the use of water in the treatment area for recreational purposes, including swimming and fishing.

Livestock Use of Water in/from Treatment Area: There are no restrictions on livestock consumption of water from the treatment area.

Precautions for Potable Water Intakes: Do not apply **HABITAT** directly to water within one-half mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within one-half mile of an active potable water intake in a standing body of water such as lake, pond or reservoir. To make aquatic applications around and within one-half mile of active potable water intakes, the water intake must be turned off during application and for a minimum of 48 hours after the application. These aquatic applications may be made only in the cases where there are alternative water sources or holding ponds, which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the applications. Note: Existing potable water intakes which are no longer in use, such as those replaced by connections to wells or a municipal

water system, are not considered to be active potable water intakes. This restriction does not apply to intermittent, inadvertent overspray of water in terrestrial use sites.

APPLICATION TO WATERS USED FOR IRRIGATION

Water treated with **HABITAT** may not be used for irrigation purposes for 120 days after application or until **HABITAT** residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

Seasonal Irrigation Waters: **HABITAT** may be applied during the off-season to surface waters that are used for irrigation on a seasonable basis, provided that there is a minimum of 120 days between **HABITAT** application and the first use of treated water for irrigation purposes or until **HABITAT** residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

Irrigation Canals/Ditches: DO NOT apply **HABITAT** to irrigation canals/ditches unless the 120-day restriction on irrigation water usage can be observed or **HABITAT** residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less. DO NOT apply **HABITAT** to dry irrigation canals/ditches.

Quiescent or Slow Moving Waters: In lakes and reservoirs DO NOT apply **HABITAT** within one (1) mile of an active irrigation water intake during the irrigation season. Applications less than one (1) mile from an inactive irrigation water intake may be made during the off-season, provided that the irrigation intake will remain inactive for a minimum 120 days after application or until **HABITAT** residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

Moving water: DO NOT apply within one-half mile downstream of an active irrigation water intake. When making applications upstream from an active irrigation water intake, the intake must be turned off for a period of time sufficient to allow the upstream portion of treated water to completely flow past the irrigation intake before use can resume. Shut off time will be determined by the speed of water flow and the distance and length of water treated upstream from the intake. Consult local, state and/or federal authorities before making any applications upstream from an active irrigation water intake.

GENERAL INFORMATION

Use Sites: **HABITAT** is an aqueous solution to be mixed with water and a surfactant and applied as a spray solution to control floating and emergent undesirable vegetation (see **AQUATIC WEEDS CONTROLLED** section and the **ADDITIONAL WEEDS CONTROLLED BY HABITAT** section) in or near bodies of water which may be flowing, non-flowing, or transient. **HABITAT** may be applied to aquatic sites that include lakes, rivers, streams, ponds, seeps, drainage ditches, canals, reservoirs, swamps, bogs, marshes, estuaries, bays, brackish water, transitional areas between terrestrial and aquatic sites and seasonal wet areas. See **AQUATIC USE** section of this label for precautions, restrictions, and instructions on aquatic uses.

Read and observe the following directions if aquatic sites are present in terrestrial noncrop areas and are part of the intended treatment area:

Herbicidal Activity: **HABITAT** will control most annual and perennial grasses and broadleaf weeds in addition to many brush and vine species with some residual control of undesirable species that germinate above the waterline. **HABITAT** is readily absorbed through emergent leaves and stems and is translocated rapidly throughout the plant, with accumulation in the meristematic regions. Treated plants stop growing soon after spray application. Chlorosis appears first in the newest leaves, and necrosis spreads from this point. In perennials, the herbicide is translocated into, and kills, underground or submerged storage organs, which

prevents regrowth. Chlorosis and tissue necrosis may not be apparent in some plant species until two or more weeks after application. Complete kill of plants may not occur for several weeks. Applications of **HABITAT® herbicide** are rainfast one hour after treatment.

HABITAT does not control plants which are completely submerged or have a majority of their foliage under water.

Application Methods: **HABITAT** must be applied to the emergent foliage of the target vegetation and has little to no activity on submerged aquatic vegetation. **HABITAT** concentrations resulting from direct application to water are not expected to be of sufficient concentration or duration to provide control of target vegetation. Application should be made in such a way as to maximize spray interception by the target vegetation while minimizing the amount of overspray that enters the water. For maximum activity, weeds should be growing vigorously at the time of application and the spray solution should include a surfactant (See **ADJUVANTS** section for specific recommendations). **HABITAT** may be selectively applied by using low-volume directed application techniques or may be broadcast-applied by using ground equipment, watercraft or by helicopter. In addition, **HABITAT** may also be used for cut stump, cut stem and frill and girdle treatments within aquatic sites (see **AERIAL APPLICATIONS** and **GROUND APPLICATIONS** sections for additional details).

HABITAT should be applied with surface or helicopter application equipment in a minimum of 5 gallons of water per acre. When applying by helicopter, follow directions under the **AERIAL APPLICATIONS** section of this label, otherwise refer to section on **GROUND APPLICATIONS** when using surface equipment.

Applications made to moving bodies of water should be made while traveling upstream to prevent concentration of this herbicide in water. DO NOT apply to bodies of water or portions of bodies of water where emergent and/or floating weeds do not exist.

When application is to be made to target vegetation that covers a large percentage of the surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in the suffocation of some sensitive aquatic organisms. Do not treat more than one half of the surface area of the water in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow aquatic organisms to move into untreated areas.

Avoid wash-off of sprayed foliage by spray boat or recreational boat backwash for one hour after application.

Apply **HABITAT** at 2 to 6 pints per acre depending on species present and weed density. DO NOT exceed the maximum label rate of 6 pints per acre (1.5 lb ai/A) per year. Use the higher labeled rates for heavy weed pressure. Consult the **AQUATIC WEEDS CONTROLLED** section and the **ADDITIONAL WEEDS CONTROLLED BY HABITAT HERBICIDE** section of this label for specific rates.

HABITAT may be applied as a draw down treatment in areas described above. Apply **HABITAT** to weeds after water has been drained and allow 14 days before reintroduction of water.

PRECAUTIONS FOR AVOIDING INJURY TO NON-TARGET PLANTS

Untreated desirable plants can be affected by root uptake of **HABITAT** from treated soil. Injury or loss of desirable plants may result if **HABITAT** is applied on or near desirable plants, on areas where their roots extend, or in locations where the treated soil may be washed or moved into contact with their roots. When making applications along shorelines where desirable plants may be present, caution should be exercised to avoid spray contact with their foliage or spray application to the soil in which they are

rooted. Shoreline plants that have roots that extend into the water in an area where **HABITAT** has been applied generally will not be adversely affected by uptake of the herbicide from the water.

If treated vegetation is to be removed from the application site, DO NOT use the vegetative matter as mulch or compost on or around desirable species.

MANAGING OFF-TARGET MOVEMENT

Spray Drift: Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related factors determines the potential for spray drift. The applicator and the entity authorizing spraying are responsible for considering all these factors when making decisions.

Spray drift from applying this product may result in damage to sensitive plants adjacent to the treatment area. Only apply this product when the potential for drift to these and other adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, or non-target crops) is minimal. Do not apply when the following conditions exist that increase the likelihood of spray drift from intended targets: high or gusty winds, high temperatures, low humidity, temperature inversions.

To minimize spray drift, the applicator should be familiar with and take into account the following drift reduction advisory information. Additional information may be available from state enforcement agencies or the Cooperative Extension on the application of this product.

The best drift management strategy and most effective way to reduce drift potential are to apply large droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see **WIND, TEMPERATURE AND HUMIDITY, and TEMPERATURE INVERSIONS**).

CONTROLLING DROPLET SIZE

- Volume - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- Pressure - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- Number of Nozzles - Use the minimum number of nozzles that provide uniform coverage.
- Nozzle Orientation - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is recommended practice. Significant deflection from the horizontal will reduce droplet size and increase drift potential.
- Nozzle Type - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift. Do not use nozzles producing a mist droplet spray.

APPLICATION HEIGHT

Making applications at the lowest possible height (helicopter, ground driven spray boom) that is safe and practical reduces exposure of droplets to evaporation and wind.

SWATH ADJUSTMENT

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the treatment area, the applicator must compensate for this displacement by adjusting the path of the application

equipment (e.g. aircraft, ground) upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller droplets, etc.).

WIND

Drift potential is lowest between wind speeds of 3-10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 3 mph due to variable wind direction and high inversion potential. NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

TEMPERATURE AND HUMIDITY

When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

TEMPERATURE INVERSIONS

Drift potential is high during a temperature inversion. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud, which can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

WIND EROSION

Avoid treating powdery dry or light sandy soils when conditions are favorable for wind erosion. Under these conditions, the soil surface should first be settled by rainfall or irrigation.

AERIAL APPLICATION METHODS AND EQUIPMENT HELICOPTERS ONLY

Water Volume: Use 2 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Managing spray drift from aerial applications: Applicators must follow these requirements to avoid off-target drift movement: 1) boom length - the distance of the outermost nozzles on the boom must not exceed $\frac{3}{4}$ the length of the rotor, 2) nozzle orientation - nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees, and 3) application height - without compromising helicopter safety, applications should be made at a height of 10 feet or less above the crop canopy or tallest plants. Applicators must follow the most restrictive use cautions to avoid drift hazards, including those found in this labeling as well as applicable state and local regulations and ordinances.

GROUND APPLICATION (BROADCAST)

Water Volume: Use 5 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

ADJUVANTS

Postemergence applications of **HABITAT® herbicide** require the addition of a spray adjuvant. Only spray adjuvants that are approved or appropriate for aquatic use should be utilized.

Nonionic Surfactants: Use a nonionic surfactant at the rate 0.25% v/v or higher (see manufacturer's label) of the spray solution (0.25% v/v is equivalent to 1 quart in 100 gallons). For best results, select a nonionic surfactant with a HLB (hydrophilic to lipophilic balance) ratio between 12 and 17 with at least 70% surfactant in the formulated product (alcohols, fatty acids, oils, ethylene glycol or diethylene glycol should not be considered as surfactants to meet the above requirements).

Methylated Seed Oils or Vegetable Oil Concentrates: Instead of a surfactant, a methylated seed oil or vegetable-based seed oil concentrate may be used at the rate of 1.5 to 2 pints per acre. When using spray volumes greater than 30 gallons per acre, methylated seed oil or vegetable based seed oil concentrates should be mixed at a rate of 1% of the total spray volume, or alternatively use a nonionic surfactant as described above. Research indicates that these oils may aid in **HABITAT** deposition and uptake by plants under moisture or temperature stress.

Silicone Based Surfactants: See manufacturer's label for specific rate recommendations. Silicone-based surfactants may reduce the surface tension of the spray droplet, allowing greater spreading on the leaf surface as compared to conventional nonionic surfactants. However, some silicone-based surfactants may dry too quickly, limiting herbicide uptake.

Invert emulsions: **HABITAT** can be applied as an invert emulsion. The spray solution results in an invert (water-in-oil) spray emulsion designed to minimize spray drift and spray runoff, resulting in more herbicide on the target foliage. The spray emulsion may be formed in a single tank (batch mixing) or injected (in-line mixing). Consult the invert chemical label for proper mixing directions.

Other: An antifoaming agent, spray pattern indicator or drift reducing agent may be applied at the product labeled rate if necessary or desired.

TANK MIXES

HABITAT may be tank-mixed with other aquatic use herbicides for the control of emergent and floating aquatic vegetation.

Consult manufacturer's labels for specific rates and weeds controlled. Always follow the more restrictive label when making an application involving tank-mixes.

AERIAL APPLICATIONS

All precautions should be taken to minimize or eliminate spray drift. Helicopters can be used to apply **HABITAT**; however, DO NOT make applications by helicopter unless appropriate buffer zones can be maintained to prevent spray drift out of the target area, or when spray drift as a result of helicopter application can be tolerated. Aerial equipment designed to minimize spray drift, such as a helicopter equipped with a Microfoil™ boom, Thru-Valve™ boom or raindrop nozzles, must be used and calibrated. Except when applying with a Microfoil boom, a drift control agent may be added at the recommended label rate. To avoid drift, applications should not be made during inversion conditions, when winds are gusty, or any other conditions which allow drift. Side trimming is not recommended with **HABITAT** unless death of treated tree can be tolerated.

Uniformly apply the recommended amount of **HABITAT** in 5 to 30 gallons of water per acre; include in the spray solution a nonionic surfactant or methylated seed oil or manufacturer's label rate of a silicone-based surfactant (See the **Adjuvants** section of this label for specific recommendations). A foam reducing agent may be added at the recommended label rate, if needed.

IMPORTANT: Thoroughly clean application equipment, including landing gear, immediately after use of this product. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of

the exposed part. The maintenance of an organic coating (paint) may prevent corrosion.

GROUND APPLICATIONS

FOLIAR APPLICATIONS

Low Volume Foliar:

Use equipment calibrated to deliver 5 to 20 gallons of spray solution per acre. To prepare the spray solution, thoroughly mix in water 0.5 to 5% **HABITAT® herbicide** plus surfactant (see the **ADJUVANTS** section of this label for specific recommendations). A foam reducing agent may be applied at the recommended label rate, if needed. For control of difficult species (see **AQUATIC WEEDS CONTROLLED** section and the **ADDITIONAL WEEDS CONTROLLED BY HABITAT** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes but do not apply more than 6 pints of **HABITAT** per acre. Excessive wetting of foliage is not recommended. See the **MIXING GUIDE** below for some suggested volumes of **HABITAT** and water.

For low volume, select proper nozzles to avoid over-application. Proper application is critical to ensure desirable results. Best results are achieved when the spray covers the crown and approximately 70 percent of the plant. The use of an even flat fan tip with a spray angle of 40 degrees or less will aid in proper deposition.

Recommended tip sizes include 4004E, or 1504E. For a straight stream and cone pattern, adjustable cone nozzles such as 5500 X3 or 5500 X4 may be used. Attaching a rollover valve onto a Spraying Systems Model 30 gunjet or other similar spray guns allows for the use of both a flat fan and cone tips on the same gun.

Moisten, but do not drench target vegetation causing spray solution to run off.

Low Volume Foliar with Backpacks:

For low-growing species, spray down on the crown, covering crown and penetrating approximately 70% of the plant.

For target species 4 to 8 feet tall, swipe the sides of target vegetation by directing spray to at least two sides of the plant in smooth vertical motions from the crown to the bottom. Make sure to cover the crown whenever possible.

For target species over 8 feet tall, lace sides of the target vegetation by directing spray to at least two sides of the target in smooth zigzag motions from crown to bottom.

Low Volume Foliar with Hydraulic Handgun Application Equipment:

Use same technique as described above for **Low Volume with Backpacks**.

For broadcast applications, simulate a gentle rain near the top of target vegetation, allowing spray to contact the crown and penetrate the target foliage without falling to the understory. Herbicide spray solution which contacts the understory may result in severe injury or death of plants in the understory.

SPRAY SOLUTION MIXING GUIDE FOR LOW-VOLUME FOLIAR APPLICATIONS

AMOUNT OF SPRAY SOLUTION BEING PREPARED	DESIRED CONCENTRATION (fluid volume)				
	0.5%	0.75%	1%	1.5%	5%
	(amount of HABITAT to use)				
1 gallon	0.6 oz.	0.9 oz.	1.3 oz.	1.9 oz.	6.5 oz.
3 gallons	1.9 oz.	2.8 oz.	3.8 oz.	5.8 oz.	1.2 pint
4 gallons	2.5 oz.	3.8 oz.	5.1 oz.	7.7 oz.	1.6 pint
5 gallons	3.2 oz.	4.8 oz.	6.5 oz.	9.6 oz.	2 pints
50 gallons	2 pints	3 pints	4 pints	6 pints	10 quarts
100 gallons	4 pints	6 pints	8 pints	6 quarts	5 gallons

2 tablespoons = 1 fluid ounce

High Volume Foliar:

For optimum performance when spraying medium to high-density vegetation, use equipment calibrated to deliver up to 100 gallons of spray solution per acre (GPA). Spray solutions exceeding 100 GPA may result in excessive spray run-off, causing increased ground cover injury, and injury to desirable species. To prepare the spray solution, thoroughly mix **HABITAT** in water and add a surfactant (see **ADJUVANT** section for specific recommendations and rates of surfactants). A foam-reducing agent may be added at the recommended label rate, if needed. For control of difficult species (see **AQUATIC WEEDS CONTROLLED BY HABITAT** section and the **ADDITIONAL WEEDS CONTROLLED BY HABITAT** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes, but do not apply more than 6 pints of **HABITAT** per acre. Uniformly cover the foliage of the vegetation to be controlled but do not apply to run-off. Excessive wetting of foliage is not recommended.

Side Trimming:

DO NOT side trim with **HABITAT** unless severe injury or death of the treated tree can be tolerated. **HABITAT** is readily translocated and can result in death of the entire tree.

CUT SURFACE TREATMENTS

HABITAT may be used to control undesirable woody vegetation by applying the **HABITAT** solution to the cambium area of freshly cut stump surfaces or to fresh cuts on the stem of the target woody vegetation. Applications can be made at any time of the year except during periods of heavy sap flow in the spring. Do not overapply solution causing run-off from the cut surface.

Injury may occur to desirable woody plants if the shoots extend from the same root system or their root systems are grafted to those of the treated tree.

CUT SURFACE APPLICATIONS WITH DILUTE AND CONCENTRATE SOLUTIONS:

HABITAT may be mixed as either a concentrated or dilute solution. The dilute solution may be used for applications to the cut surface of the stump or to cuts on the stem of the target woody vegetation. Concentrated solutions may be used for applications to cuts on the stem. Use of the concentrated solution permits application to fewer cuts on the stem, especially for large diameter trees. Follow the application instructions to determine proper application techniques for each type of solution.

- To prepare a dilute solution, mix 8 to 12 fluid ounces of **HABITAT® herbicide** with one gallon of water. The use of a surfactant or penetrating agent may improve uptake through partially callused cambiums.
- To prepare a concentrated solution, mix 2 quarts of **HABITAT** with no more than 1 quart of water.

Cut stump treatments:

- Dilute Solution- spray or brush the solution onto the cambium area of the freshly cut stump surface. Insure that the solution thoroughly wets the entire cambium area (the wood next to the bark of the stump).

Cut stem (injection, hack & squirt) treatments:

- Dilute Solutions- Using standard injection equipment, apply 1 milliliter of solution at each injection site around the tree with no more than one-inch intervals between cut edges. Insure that the injector completely penetrates the bark at each injection site.
- Concentrate Solutions- Using standard injection equipment, apply 1 milliliter of solution at each injection site. Make at least one injection cut for every 3 inches of Diameter at Breast Height (DBH) on the target tree. For example, a 3-inch DBH tree will receive 1 injection cut and a 6-inch DBH tree will receive 2 injection cuts. On trees requiring more than one injection site place the injection cuts at approximately equal intervals around the tree.

Frill or girdle treatments:

- Using a hatchet, machete, or chainsaw, make cuts through the bark and completely around the tree to expose the cambium. The cut should angle downward extending into the cambium enough to expose at least two growth rings. Using a spray applicator or brush, apply a 25% to 100% solution of **HABITAT** into each cut until thoroughly wet. Avoid applying so much herbicide that runoff to the ground or water occurs.

AQUATIC SPECIES CONTROLLED

HABITAT® herbicide will control the following target species as specified in the BASF RECOMMENDATION section of the table. Rate recommendations are expressed in terms of product volume for broadcast applications and as a % solution for directed applications including spot treatments. **For % solution applications, DO NOT apply more than the equivalent of 3 quarts of HABITAT per acre.**

COMMON NAME	SCIENTIFIC NAME	BASF RECOMMENDATION
Floating Species		
*Duckweed	<i>Lemna minor</i>	2-3 pints/acre (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage.
*Duckweed, Giant	<i>Spirodela polyrida</i>	2-3 pints/acre (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage.
*Frogbit	<i>Limnobium spongia</i>	1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage.
*Spatterdock	<i>Nuphar luteum</i>	Apply a tank-mix of 2-4 pints/acre HABITAT + 4 to 6 pints/acre glyphosate (0.5% HABITAT + 1.5% glyphosate) in 100 GPA water for best control. Ensure 100% coverage of actively growing, emergent foliage.
*Water Hyacinth	<i>Eichhornia crassipes</i>	1-2 pints/acre (0.5% solution) applied in 100 GPA water to actively growing foliage.
*Water Lettuce	<i>Pistia stratiotes</i>	1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage.
Emerged Species		
*Alligatorweed	<i>Alternanthera philoxeroides</i>	1 to 4 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage. Tank-mix with glyphosate is NOT recommended, and may reduce alligatorweed control, requiring higher HABITAT rates.
*Arrowhead, Duck-potato	<i>Sagittaria spp.</i>	1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage.
*Bacopa, lemon	<i>Bacopa spp.</i>	1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage.
*Parrot feather	<i>Myriophyllum aquaticum</i>	Must be foliage above water for sufficient HABITAT uptake. Apply 2 - 4 pints to actively growing emergent foliage.
*Pennywort	<i>Hydrocotyle spp.</i>	1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage.
*Pickerelweed	<i>Pontederia cordata</i>	2-3 pints/acre (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage.
*Taro, wild; Dasheen; Elephant's Ear; Coco Yam	<i>Colocasia esculentum</i>	4-6 pints/acre (1.5% solution) applied in 100 GPA with a high quality 'sticker' adjuvant. Ensure good coverage of actively growing, emergent foliage.
*Water lily	<i>Nymphaea odorata</i>	2-3 pints/acre (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage.
*Water primrose	<i>Ludwigia uruguayensis</i>	4-6 pints/acre (1.5% solution), ensure 100% coverage of actively growing, emergent foliage. Tank-mix with glyphosate is NOT recommended and may reduce water primrose control.

* Not approved for use in California

AQUATIC SPECIES CONTROLLED (continued)

COMMON NAME	SCIENTIFIC NAME	BASF RECOMMENDATION
Terrestrial/Marginal		
*Soda Apple, aquatic; Nightshade	<i>Solanum tampicense</i>	2 pts./acre applied to foliage
*Bamboo, Japanese	<i>Phyllostachys spp.</i>	3 to 4 pints/acre applied to the foliage when plant is actively growing. Before setting seed head. More foliage will result in greater herbicide uptake, resulting in greater root kill.
Brazilian Pepper; Christmasberry	<i>Schinus terebinthifolius</i>	2 - 4 pints/acre applied to foliage
Cattail	<i>Typha spp.</i>	2-4 pints (1% solution) applied to actively growing, green foliage after full leaf elongation. Lower rates will control cattail in the north; higher rates are needed in the south.
Chinese Tallow Tree	<i>Sapium sebiferum</i>	16 to 24 oz applied to foliage
Cogon Grass	<i>Imperata cylindrica</i>	Burn foliage, till area, that fall spray 2 qt./acre HABITAT® herbicide + MSO applied to new growth.
Cordgrass, prairie	<i>Spartina spp.</i>	4-6 pints applied to actively growing foliage
*Cutgrass	<i>Zizaniopsis miliacea</i>	4-6 pints applied to actively growing foliage
*Elephant Grass; Napier Grass-	<i>Pennisetum purpureum</i>	3 pts./acre applied to actively growing foliage
*Flowering rush	<i>Butumu typla</i>	2-3 pints applied to actively growing foliage
Giant Reed, Wild Cane	<i>Arundo donax</i>	4 to 6 pints/acre applied in spring to actively growing foliage
*Golden Bamboo	<i>Phyllostachys aurea</i>	3 to 4 pints/acre applied to the foliage when plant is actively growing. Before setting seed head. More foliage will result in greater herbicide uptake, resulting in greater root kill.
Junglerice	<i>Echinochloa colonum</i>	3-4 pints applied to actively growing foliage
Knapweeds	<i>Centaurea species</i>	Russian Knapweed - 2 to 3 pints + 1 qt./acre MSO fall applied after senescence begins
Knotweed, Japanese (see Fallopia japonica)	<i>Polygonum cuspidatum</i>	3 to 4 pts./acre applied postemergence to actively growing foliage
Melaleuca; Paperbark Tree	<i>Melaleuca quinquenervia</i>	For established stands, apply 6 pints/acre HABITAT + 6 pints/acre glyphosate + spray adjuvant. For best results use 4 qt./A methylated seed oil as an adjuvant. For ground foliar application, uniformly apply to ensure 100% coverage. For broadcast foliar control, apply aerially in a minimum of two passes at 10 gallons/acre applied cross treatment. For spot treatment use a 25% HABITAT + 25% solution of + glyphosate + 1.25% MSO in water applied as a frill or stump treatment.
*Nutgrass; Kill'p'opu	<i>Cyperus rotundus</i>	2 pints HABITAT + 1 qt./acre MSO applied early postemergence
*Nutsedge	<i>Cyperus spp.</i>	2 to 3 pints postemergence to foliage or pre-emergence incorporated, non-incorporated preemergence applications will not control.

* Not approved for use in California

AQUATIC SPECIES CONTROLLED (continued)

COMMON NAME	SCIENTIFIC NAME	BASF RECOMMENDATION
Terrestrial/Marginal (Cont.)		
Phragmites; Common Reed	<i>Phragmites australis</i>	4 to 6 pints/acre applied to actively growing, green foliage after full leaf elongation, ensure 100% coverage. If stand has a substantial amount of old stem tissue, mow or burn, allow to regrow to approximately 5' tall before treatment. Lower rates will control phragmites in the north; higher rates are needed in the south.
*Poison Hemlock	<i>Conium maculatum</i>	2 pints HABITAT® herbicide + 1 qt./acre MSO applied preemergence to early postemergence to rosette, prior to flowering
Purple Loosestrife	<i>Lythrum salicaria</i>	1 pint/acre applied to actively growing foliage
Reed canarygrass	<i>Phalaris arundinacea</i>	3 to 4 pints/acre applied to actively growing foliage
Rose, swamp	<i>Rosa palustris</i>	2 to 3 pts./acre applied to actively growing foliage
Russian-Olive	<i>Elaeagnus angustifolia</i>	2 to 4 pints/acre or a 1% solution, applied to foliage
Saltcedar; Tamarisk	<i>Tamarix species</i>	Aerial apply 2 qts. HABITAT + 0.25%v/v NIS applied to actively growing foliage during flowering. For spot spraying use 1% solution of HABITAT + 0.25%v/v NIS and spray to wet foliage. After application wait at least two years before disturbing treated saltcedar. Earlier disturbance can reduce overall control.
Smartweed	<i>Polygonum spp.</i>	2 pints/acre applied early postemergence
Sumac	<i>Rhus spp.</i>	2 to 3 pts./acre applied to foliage
Swamp Morning Glory; Water Spinach; Kangkong	<i>Ipomoea aquatica</i>	1 to 2 pints/acre HABITAT + 1 qt./acre MSO applied early postemergence
Torpedo Grass	<i>Panicum repens</i>	4 pints/acre (1 - 1.5% solution), ensure good coverage to actively growing foliage.
*White Top; Hoary Cress	<i>Cardaria draba</i>	1 to 2 pints/acre applied in spring, to foliage, during flowering.
Willow	<i>Salix spp.</i>	2 to 3 pts./acre HABITAT applied to actively growing foliage, ensure good coverage.

* Not approved for use in California

ADDITIONAL WEEDS CONTROLLED BY HABITAT HERBICIDE

In terrestrial sites, **HABITAT** will provide preemergence or postemergence control with residual control of the following target vegetation species at the rates listed. Residual control refers to control of newly germinating seedlings in both annuals and perennials. In general, annual weeds may be controlled by preemergence or postemergence applications of **HABITAT**. **For established biennials and perennials postemergence applications of HABITAT are recommended.**

The rates shown below pertain to broadcast applications and indicate the relative sensitivity of these weeds. The relative sensitivity should be referenced when preparing low volume spray solutions (see "Low Volume" section of "Ground Applications"); low volume applications may provide control of the target species with less **HABITAT** per acre than is shown for the broadcast treatments. **HABITAT** should be used only

in accordance with the recommendations on this label and the leaflet label.

The relative sensitivity of the species listed below can also be used to determine the relative risk of causing non-target plant injury if any of the below listed species are considered to be desirable within the area to be treated.

Resistant Biotypes: Naturally occurring biotypes (a plant within a given species that has a slightly different, but distinct genetic makeup from other plants of the same species) of some weeds listed on this label may not be effectively controlled. If naturally occurring resistant biotypes are present in an area, **HABITAT** should be tank-mixed or applied sequentially with an appropriate registered herbicide having a different mode of action to ensure control.

GRASSES

COMMON NAME	SPECIES	GROWTH HABIT ²
Apply 2-3 pints per acre¹		
Annual bluegrass	<i>(Poa annua)</i>	A
Broadleaf signalgrass	<i>(Brachiaria platyphylla)</i>	A
Canada bluegrass	<i>(Poa compressa)</i>	P
Downy brome	<i>(Bromus tectorum)</i>	A
Fescue	<i>(Festuca spp.)</i>	A/P
Foxtail	<i>(Setaria spp.)</i>	A
Italian ryegrass	<i>(Lolium multiflorum)</i>	A
Johnsongrass	<i>(Sorghum halepense)</i>	P
Kentucky bluegrass	<i>(Poa pratensis)</i>	P
Lovegrass	<i>(Eragrostis spp.)</i>	A/P
*Napier grass	<i>(Pennisetum purpureum)</i>	P
Orchardgrass	<i>(Dactylis glomerata)</i>	P
Paragrass	<i>(Brachiaria mutica)</i>	P
Quackgrass	<i>(Agropyron repens)</i>	P
Sandbur	<i>(Cenchrus spp.)</i>	A
Sand dropseed	<i>(Sporobolus cryptandrus)</i>	P
Smooth brome	<i>(Bromus inermis)</i>	P
Vaseygrass	<i>(Paspalum urvillei)</i>	P
Wild oats	<i>(Avena fatua)</i>	A
Witchgrass	<i>(Panicum capillare)</i>	A

Apply 3-4 pints per acre¹

Barnyardgrass	<i>(Echinochloa crus-gali)</i>	A
Beardgrass	<i>(Andropogon spp.)</i>	P
Bluegrass, Annual	<i>(Poa annua)</i>	A
*Bulrush	<i>(Scirpus validus)</i>	P
Cheat	<i>(Bromus secalinus)</i>	A
Crabgrass	<i>(Digitaria spp.)</i>	A
Crowfootgrass	<i>(Dactyloctenium aegyptium)</i>	A
Fall panicum	<i>(Panicum dichotomiflorum)</i>	A
Goosegrass	<i>(Eleusine indica)</i>	A
Itchgrass	<i>(Rottboellia exaltata)</i>	A
Lovegrass	<i>(Eragrostis spp.)</i>	A
*Maidencane	<i>(Panicum hemitomon)</i>	A
Panicum, Browntop	<i>(Panicum fasciculatum)</i>	A
Panicum, Texas	<i>(Panicum texanum)</i>	A
Prairie threeawn	<i>(Aristida oligantha)</i>	P
Sandbur, Field	<i>(Cenchrus incertus)</i>	A
Signalgrass	<i>(Brachiaria platyphylla)</i>	A
Wild barley	<i>(Hordeum spp.)</i>	A
Woolly Cupgrass	<i>(Eriochloa villosa)</i>	A

Apply 4-6 pints per acre¹

Bahiagrass	<i>(Paspalum notatum)</i>	P
Bermudagrass ³	<i>(Cynodon dactylon)</i>	P
Big bluestem	<i>(Andropogon gerardii)</i>	P
Dallisgrass	<i>(Paspalum dilatatum)</i>	P
Feathertop	<i>(Pennisetum villosum)</i>	P
Guineagrass	<i>(Panicum maximum)</i>	P
Saltgrass ³	<i>(Distichlis stricta)</i>	P
Sand dropseed	<i>(Sporobolus cryptandrus)</i>	P

GRASSES (CONT)

COMMON NAME	SPECIES	GROWTH HABIT ²
Sprangletop	<i>(Leptochloa spp.)</i>	A
Timothy	<i>(Phleum pratense)</i>	P
Wirestem muhly	<i>(Muhlenbergia frondosa)</i>	P

BROADLEAF WEEDS

COMMON NAME	SPECIES	GROWTH HABIT ²
Apply 2-3 pints per acre¹		
Burdock	<i>(Arctium spp.)</i>	B
Carpetweed	<i>(Mollugo verticillata)</i>	A
Carolina geranium	<i>(Geranium carolinianum)</i>	A
Clover	<i>(Trifolium spp.)</i>	A/P
Common chickweed	<i>(Stellaria media)</i>	A
Common ragweed	<i>(Ambrosia artemisiifolia)</i>	A
Dandelion	<i>(Taraxacum officinale)</i>	P
Dog fennel	<i>(Eupatorium capillifolium)</i>	A
Filaree	<i>(Erodium spp.)</i>	A
Fleabane	<i>(Erigeron spp.)</i>	A
Hoary vervain	<i>(Verbena stricta)</i>	P
Indian mustard	<i>(Brassica juncea)</i>	A
Kochia	<i>(Kochia scoparia)</i>	A
Lambsquarters	<i>(Chenopodium album)</i>	A
*Lespedeza	<i>(Lespedeza spp.)</i>	P
Miners lettuce	<i>(Montia perfoliata)</i>	A
Mullein	<i>(Verbascum spp.)</i>	B
Nettleleaf goosefoot	<i>(Chenopodium murale)</i>	A
Oxeye daisy	<i>(Chrysanthemum leucanthemum)</i>	P
Pepperweed	<i>(Lepidium spp.)</i>	A
Pigweed	<i>(Amaranthus spp.)</i>	A
Puncturevine	<i>(Tribulus terrestris)</i>	A
Russian thistle	<i>(Salsola kali)</i>	A
Smartweed	<i>(Polygonum spp.)</i>	A/P
Sorrell	<i>(Rumex spp.)</i>	P
Sunflower	<i>(Helianthus spp.)</i>	A
Sweet clover	<i>(Melilotus spp.)</i>	A/B
Tansymustard	<i>(Descurainia pinnata)</i>	A
Western ragweed	<i>(Ambrosia psilostachya)</i>	P
Wild carrot	<i>(Daucus carota)</i>	B
Wild lettuce	<i>(Lactuca spp.)</i>	A/B
Wild parsnip	<i>(Pastinaca sativa)</i>	B
Wild turnip	<i>(Brassica campestris)</i>	B
Woollyleaf bursage	<i>(Franseria tomentosa)</i>	P
Yellow woodsorrel	<i>(Oxalis stricta)</i>	P

Apply 3-4 pints per acre¹

Broom snakeweed ⁴	<i>(Gutierrezia sarothrae)</i>	P
Bull thistle	<i>(Cirsium vulgare)</i>	B
Burclover	<i>(Medicago spp.)</i>	A
Chickweed, Mouseear	<i>(Cerastium vulgatum)</i>	A
Clover, Hop	<i>(Trifolium procumbens)</i>	A
Cocklebur	<i>(Xanthium strumarium)</i>	A

BROADLEAF WEEDS (CONT)

COMMON NAME	SPECIES	GROWTH HABIT ²
Cudweed	(<i>Gnaphalium</i> spp.)	A
Desert Camelthorn	(<i>Alhagi pseudalhagi</i>)	P
Dock	(<i>Rumex</i> spp.)	P
Fiddleneck	(<i>Amsinckia intermedia</i>)	A
Goldenrod	(<i>Solidago</i> spp.)	P
Henbit	(<i>Lamium applexicaule</i>)	A
Knotweed, prostrate	(<i>Polygonum aviculare</i>)	A/P
Pokeweed	(<i>Phytolacca americana</i>)	P
Purshane	(<i>Portulaca</i> spp.)	A
Pusley, Florida	(<i>Richardia scabra</i>)	A
Rocket, London	(<i>Sisymbrium irio</i>)	A
Rush skeletonweed ⁴	(<i>Chondrilla juncea</i>)	B
Saltbush	(<i>Atriplex</i> spp.)	A
Shepherd's-purse	(<i>Capsella bursa-pastoris</i>)	A
Spurge, Annual	(<i>Euphorbia</i> spp.)	A
Stinging nettle ⁴	(<i>Urtica dioica</i>)	P
Velvetleaf	(<i>Abutilon theophrasti</i>)	A
Yellow starthistle	(<i>Centaurea solstitialis</i>)	A

Apply 4-6 pints per acre¹

Arrowwood	(<i>Pluchea sericea</i>)	A
Canada thistle	(<i>Cirsium arvense</i>)	P
Giant ragweed	(<i>Ambrosia trifida</i>)	A
Grey rabbitbrush	(<i>Chrysothamnus nauseosus</i>)	P
Little mallow	(<i>Malva parviflora</i>)	B
Milkweed	(<i>Asclepias</i> spp.)	P
Primrose	(<i>Oenothera kunthiana</i>)	P
Silverleaf nightshade	(<i>Solanum eleagnifolium</i>)	P
Sowthistle	(<i>Sonchus</i> spp.)	A
Texas thistle	(<i>Cirsium texanum</i>)	P

VINES AND BRAMBLES

COMMON NAME	SPECIES	GROWTH HABIT ²
Apply 1 pint per acre		
Field bindweed	(<i>Convolvulus arvensis</i>)	P
Hedge bindweed	(<i>Calystegia sequium</i>)	A
Apply 2-3 pints per acre¹		
Wild buckwheat	(<i>Polygonum convolvulus</i>)	P
Apply 3-4 pints per acre¹		
Greenbriar	(<i>Smilax</i> spp.)	P
Honeysuckle	(<i>Lonicera</i> spp.)	P
Morningglory	(<i>Ipomoea</i> spp.)	A/P
Poison ivy	(<i>Rhus radicans</i>)	P
Redvine	(<i>Brunnichia cirrhosa</i>)	P
Wild rose	(<i>Rosa</i> spp.)	P
Including:		
Multiflora rose	(<i>Rosa multiflora</i>)	P
McCartney rose	(<i>Rosa bracteata</i>)	P
Apply 4-6 pints per acre¹		
*Kudzu ³	(<i>Pueraria lobata</i>)	P
Trumpet creeper	(<i>Campsis radicans</i>)	P
Virginia creeper	(<i>Parthenocissus quinquefolia</i>)	P
Wild grape	(<i>Vitis</i> spp.)	P

BRUSH SPECIES

COMMON NAME	SPECIES	GROWTH HABIT ²
Apply 4-6 pints per acre¹		
American beech	(<i>Fagus grandifolia</i>)	P
Ash	(<i>Fraxinus</i> spp.)	P
Bald cypress	(<i>Taxodium distichum</i>)	P
Bigleaf maple	(<i>Acer macrophyllum</i>)	P
Black locust ⁵	(<i>Robinia pseudoacacia</i>)	P
Black gum	(<i>Nyssa sylvatica</i>)	P
Box elder	(<i>Acer negundo</i>)	P
Cherry	(<i>Prunus</i> spp.)	P
Chinaberry	(<i>Melia azadarach</i>)	P
Dogwood	(<i>Cornus</i> spp.)	P
Elm ⁶	(<i>Ulmus</i> spp.)	P
Hawthorn	(<i>Crataegus</i> spp.)	P
Hickory	(<i>Carya</i> spp.)	P
Honeylocust ⁵	(<i>Gleditsia triacanthos</i>)	P
Maple	(<i>Acer</i> spp.)	P
Mulberry	(<i>Morus</i> spp.)	P
Oak	(<i>Quercus</i> spp.)	P
Persimmon	(<i>Diospyros virginiana</i>)	P
*Pine ⁵	(<i>Pinus</i> spp.)	P
Poplar	(<i>Populus</i> spp.)	P
Privet	(<i>Ligustrum vulgare</i>)	P
Red Alder	(<i>Alnus rubra</i>)	P
Red Maple	(<i>Acer rubrum</i>)	P
Russian Olive	(<i>Eleagnus angustifolia</i>)	P
Sassafras	(<i>Sassafras albidum</i>)	P
Sourwood	(<i>Oxydendrum arboreum</i>)	P
Sweetgum	(<i>Liquidambar styraciflua</i>)	P
*Water willow	(<i>Justica americana</i>)	P
Willow	(<i>Salix</i> spp.)	P
Yellow poplar	(<i>Liriodendron tulipifera</i>)	P

¹ The higher rates should be used where heavy or well-established infestations occur.

² Growth Habit - A = Annual, B = Biennial, P = Perennial

³ Use a minimum of 75 GPA - Control of established stands may require repeat applications.

⁴ For best results early postemergence applications are required.

⁵ Tank mix with glyphosate or triclopyr.

⁶ Tank-mix with with glyphosate.

* Not approved for use in California

DISCLAIMER

The label instructions for the use of this product reflect the opinion of experts based on research and field use. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Turf injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the use of, or application of the product contrary to label instructions, all of which are beyond the control of BASF Corporation (BASF). All such risks shall be assumed by the user.

BASF shall not be responsible for losses or damages resulting from use of this product in any manner not set forth on this label. User assumes all risks associated with the use of this product in any manner not specifically set forth on this label.

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Research Triangle Park, NC 27709


The Chemical Company

Safety Data Sheet

HABITAT HERBICIDE

Revision date : 2014/09/25
Version: 2.0

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1. Identification

Product identifier used on the label

HABITAT HERBICIDE

Recommended use of the chemical and restriction on use

Recommended use*: herbicide

* The "Recommended use" identified for this product is provided solely to comply with a US Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:
BASF CORPORATION
100 Park Avenue
Florham Park, NJ 07932, USA

Telephone: +1 973 245-6000

Emergency telephone number

CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP (4357)

Other means of identification

Substance number: 63383
EPA Register number: 241-426
Molecular formula: C(13) H(15) N(3) O(3). C(3) H(9) N
Chemical family: imidazole derivative
Synonyms: Isopropylamine salt of imazapyr

2. Hazards Identification

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Classification of the product

Skin Corr./Irrit.	1A	Skin corrosion/irritation
Aquatic Acute	1	Hazardous to the aquatic environment - acute
Aquatic Chronic	1	Hazardous to the aquatic environment - chronic

Label elements

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Pictogram:



Signal Word:
Danger

Hazard Statement:

H314 Causes severe skin burns and eye damage.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements (Prevention):

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P273 Avoid release to the environment.
P260 Do not breathe dust or mist.
P264 Wash with plenty of water and soap thoroughly after handling.

Precautionary Statements (Response):

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
P310
P303 + P361 + P352 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P391 Collect spillage.

Precautionary Statements (Storage):

P405 Store locked up.

Precautionary Statements (Disposal):

P501 Dispose of contents/container to hazardous or special waste collection point.

Hazards not otherwise classified

Labeling of special preparations (GHS):

The following percentage of the mixture consists of components(s) with unknown hazards regarding the acute toxicity: 0 - 1 % dermal

The following percentage of the mixture consists of components(s) with unknown hazards regarding the acute toxicity: 0 - 1 % oral

The following percentage of the mixture consists of components(s) with unknown hazards regarding the acute toxicity: 0 - 1 % Inhalation - vapour

The following percentage of the mixture consists of components(s) with unknown hazards regarding the acute toxicity: 0 - 1 % Inhalation - mist

According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Emergency overview

CAUTION:
KEEP OUT OF REACH OF CHILDREN.

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Avoid contact with the skin, eyes and clothing.
Avoid inhalation of mists/vapours.

3. Composition / Information on Ingredients

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Content (W/W)</u>	<u>Chemical name</u>
75-31-0	>= 3.0 - < 7.0 %	isopropylamine
81334-34-1	>= 20.0 - < 25.0 %	Imazapyr

According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Content (W/W)</u>	<u>Chemical name</u>
81510-83-0	>= 27.77 - <= 27.8 %	Isopropylamine salt of imazapyr
	72.2 %	Proprietary ingredients

4. First-Aid Measures

Description of first aid measures

General advice:

First aid providers should wear personal protective equipment to prevent exposure. Remove contaminated clothing. Move person to fresh air. If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or physician for treatment advice. Have the product container or label with you when calling a poison control center or doctor or going for treatment.

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:

Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary.

Keep patient calm, remove to fresh air, seek medical attention. Immediately administer a corticosteroid from a controlled/metered dose inhaler.

If on skin:

Rinse skin immediately with plenty of water for 15 - 20 minutes.

Immediately wash thoroughly with plenty of water, apply sterile dressings, consult a skin specialist.

If in eyes:

Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing.

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Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

If swallowed:

Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

Do not induce vomiting. Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

Most important symptoms and effects, both acute and delayed

Symptoms: No significant reaction of the human body to the product known.

Indication of any immediate medical attention and special treatment needed

Note to physician

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
foam, dry powder, carbon dioxide, water spray

Special hazards arising from the substance or mixture

Hazards during fire-fighting:
carbon monoxide, carbon dioxide, nitrogen oxide, nitrogen dioxide, Hydrocarbons,
If product is heated above decomposition temperature, toxic vapours will be released. The substances/groups of substances mentioned can be released if the product is involved in a fire.

Advice for fire-fighters

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:

Evacuate area of all unnecessary personnel. Contain contaminated water/firefighting water. Do not allow to enter drains or waterways.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Take appropriate protective measures. Clear area. Shut off source of leak only under safe conditions. Extinguish sources of ignition nearby and downwind. Ensure adequate ventilation. Wear suitable personal protective clothing and equipment.

Environmental precautions

Do not discharge into the subsoil/soil. Do not discharge into drains/surface waters/groundwater. Contain contaminated water/firefighting water.

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HABITAT HERBICIDE

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Methods and material for containment and cleaning up

Dike spillage. Pick up with suitable absorbent material. Place into suitable containers for reuse or disposal in a licensed facility. Spilled substance/product should be recovered and applied according to label rates whenever possible. If application of spilled substance/product is not possible, then spills should be contained, solidified, and placed in suitable containers for disposal. After decontamination, spill area can be washed with water. Collect wash water for approved disposal.

7. Handling and Storage

Precautions for safe handling

RECOMMENDATIONS ARE FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS. PESTICIDE APPLICATORS & WORKERS must refer to the Product Label and Directions for Use attached to the product for Agricultural Use Requirements in accordance with the EPA Worker Protection Standard 40 CFR part 170. Ensure adequate ventilation. Provide good ventilation of working area (local exhaust ventilation if necessary). Keep away from sources of ignition - No smoking. Keep container tightly sealed. Protect contents from the effects of light. Protect against heat. Protect from air. Handle and open container with care. Do not open until ready to use. Once container is opened, content should be used as soon as possible. Avoid aerosol formation. Avoid dust formation. Provide means for controlling leaks and spills. Do not return residues to the storage containers. Follow label warnings even after container is emptied. The substance/ product may be handled only by appropriately trained personnel. Avoid all direct contact with the substance/product. Avoid contact with the skin, eyes and clothing. Avoid inhalation of dusts/mists/vapours. Wear suitable personal protective clothing and equipment.

Protection against fire and explosion:

The relevant fire protection measures should be noted. Fire extinguishers should be kept handy. Avoid all sources of ignition: heat, sparks, open flame. Sources of ignition should be kept well clear. Avoid extreme heat. Keep away from oxidizable substances. Electrical equipment should conform to national electric code. Ground all transfer equipment properly to prevent electrostatic discharge. Electrostatic discharge may cause ignition.

Conditions for safe storage, including any incompatibilities

Segregate from incompatible substances. Segregate from foods and animal feeds. Segregate from textiles and similar materials.

Further information on storage conditions: Keep only in the original container in a cool, dry, well-ventilated place away from ignition sources, heat or flame. Protect containers from physical damage. Protect against contamination. The authority permits and storage regulations must be observed.

Protect from temperatures below: 0 °C

Changes in the properties of the product may occur if substance/product is stored below indicated temperature for extended periods of time.

Protect from temperatures above: 40 °C

Changes in the properties of the product may occur if substance/product is stored above indicated temperature for extended periods of time.

8. Exposure Controls/Personal Protection

Users of a pesticidal product should refer to the product label for personal protective equipment requirements.

Components with occupational exposure limits

isopropylamine	OSHA PEL	PEL 5 ppm 12 mg/m ³ ; STEL value 10 ppm 24 mg/m ³ ; TWA value 5 ppm 12 mg/m ³ ;
	ACGIH TLV	TWA value 5 ppm ; STEL value 10 ppm ;

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Advice on system design:

Whenever possible, engineering controls should be used to minimize the need for personal protective equipment.

Personal protective equipment

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

Respiratory protection:

Wear respiratory protection if ventilation is inadequate. Wear a NIOSH-certified (or equivalent) TC23C Chemical/Mechanical type filter system to remove a combination of particles, gas and vapours. For situations where the airborne concentrations may exceed the level for which an air purifying respirator is effective, or where the levels are unknown or Immediately Dangerous to Life or Health (IDLH), use NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions.

Hand protection:

Chemical resistant protective gloves, Protective glove selection must be based on the user's assessment of the workplace hazards.

Eye protection:

Safety glasses with side-shields. Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:

Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

General safety and hygiene measures:

Wear long sleeved work shirt and long work pants in addition to other stated personal protective equipment. Work place should be equipped with a shower and an eye wash. Handle in accordance with good industrial hygiene and safety practice. Personal protective equipment should be decontaminated prior to reuse. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks). Take off immediately all contaminated clothing. Store work clothing separately. Hands and/or face should be washed before breaks and at the end of the shift. No eating, drinking, smoking or tobacco use at the place of work. Keep away from food, drink and animal feeding stuffs.

9. Physical and Chemical Properties

Form:	liquid	
Odour:	ammonia-like, faint odour	
Odour threshold:		not applicable, odour not perceivable
Colour:	blue, clear	
pH value:	6.6 - 7.2	
Freezing point:	approx. 0 °C	(1,013.3 hPa) Information applies to the solvent.
Boiling point:	approx. 100 °C	(1,013.3 hPa) Information applies to the solvent.
Flash point:		A flash point determination is unnecessary due to the high water content.
Flammability:	not applicable	

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Lower explosion limit:		As a result of our experience with this product and our knowledge of its composition we do not expect any hazard as long as the product is used appropriately and in accordance with the intended use.
Upper explosion limit:		As a result of our experience with this product and our knowledge of its composition we do not expect any hazard as long as the product is used appropriately and in accordance with the intended use.
Autoignition:		Based on the water content the product does not ignite.
Vapour pressure:	approx. 23.3 hPa < 100 hPa	(20 °C) Information applies to the solvent. (50 °C) Information applies to the solvent.
Density:	1.04 - 1.09 g/ml	
Vapour density:		not applicable
Partitioning coefficient n-octanol/water (log Pow):		not applicable
Thermal decomposition:		carbon monoxide, carbon dioxide, nitrogen oxide Stable at ambient temperature. If product is heated above decomposition temperature toxic vapours may be released. If product is heated above decomposition temperature hazardous fumes may be released.
Viscosity, dynamic:	approx. 26.3 mPa.s approx. 15.8 mPa.s	(20 °C) (40 °C)
Solubility in water:		miscible
Molar mass:	320.4 g/mol	
Evaporation rate:		not applicable
Other Information:		If necessary, information on other physical and chemical parameters is indicated in this section.

10. Stability and Reactivity

Reactivity

No hazardous reactions if stored and handled as prescribed/indicated.

Corrosion to metals:

Corrosive effect on: mild steel brass

Oxidizing properties:

Not an oxidizer.

Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions

The product is chemically stable.

Conditions to avoid

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Avoid all sources of ignition: heat, sparks, open flame. Avoid prolonged storage. Avoid electro-static discharge. Avoid contamination. Avoid prolonged exposure to extreme heat. Avoid extreme temperatures.

Incompatible materials

oxidizing agents, reducing agents

Hazardous decomposition products

Decomposition products:

Hazardous decomposition products: No hazardous decomposition products if stored and handled as prescribed/indicated., Prolonged thermal loading can result in products of degradation being given off.

Thermal decomposition:

Possible thermal decomposition products:

carbon monoxide, carbon dioxide, nitrogen oxide

Stable at ambient temperature. If product is heated above decomposition temperature toxic vapours may be released. If product is heated above decomposition temperature hazardous fumes may be released.

11. Toxicological information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity

Assessment of acute toxicity: Relatively nontoxic after single ingestion. Slightly toxic after short-term skin contact. Relatively nontoxic after short-term inhalation.

Information on: isopropylamine

Assessment of acute toxicity: Of high toxicity after single ingestion. Of pronounced toxicity after short-term inhalation. Of pronounced toxicity after short-term skin contact.

Oral

Type of value: LD50

Species: rat (male/female)

Value: > 5,000 mg/kg

Inhalation

Type of value: LC50

Species: rat (male/female)

Value: > 5.3 mg/l (OECD Guideline 403)

Exposure time: 4 h

An aerosol was tested.

Dermal

Type of value: LD50

Species: rabbit (male/female)

Value: > 2,000 mg/kg

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Irritation / corrosion

Assessment of irritating effects: May cause slight but temporary irritation to the eyes. May cause slight irritation to the skin.

Information on: isopropylamine

Assessment of irritating effects: Highly corrosive! Damages skin and eyes. Causes temporary irritation of the respiratory tract.

Skin

Species: rabbit

Result: Slightly irritating.

Method: Primary skin irritation test

Eye

Species: rabbit

Result: non-irritant

Sensitization

Assessment of sensitization: Skin sensitizing effects were not observed in animal studies.

Skin sensitization test

Species: guinea pig

Result: Skin sensitizing effects were not observed in animal studies.

Chronic Toxicity/Effects

Repeated dose toxicity

Assessment of repeated dose toxicity: The product has not been tested. The statement has been derived from the properties of the individual components. No substance-specific organotoxicity was observed after repeated administration to animals.

Genetic toxicity

Assessment of mutagenicity: The product has not been tested. The statement has been derived from the properties of the individual components. Mutagenicity tests revealed no genotoxic potential.

Carcinogenicity

Assessment of carcinogenicity: The product has not been tested. The statement has been derived from the properties of the individual components. The results of various animal studies gave no indication of a carcinogenic effect.

Reproductive toxicity

Assessment of reproduction toxicity: The product has not been tested. The statement has been derived from the properties of the individual components. The results of animal studies gave no indication of a fertility impairing effect.

Teratogenicity

Assessment of teratogenicity: The product has not been tested. The statement has been derived from the properties of the individual components. Animal studies gave no indication of a developmental toxic effect at doses that were not toxic to the parental animals.

Other Information

Misuse can be harmful to health.

Symptoms of Exposure

No significant reaction of the human body to the product known.

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Medical conditions aggravated by overexposure

Data available do not indicate that there are medical conditions that are generally recognized as being aggravated by exposure to this substance/product. See MSDS section 11 - Toxicological information.

12. Ecological Information

Toxicity

Aquatic toxicity

Assessment of aquatic toxicity:

There is a high probability that the product is not acutely harmful to fish. There is a high probability that the product is not acutely harmful to aquatic invertebrates. Acutely harmful for aquatic plants.

Aquatic toxicity

Information on: Imazapyr

Assessment of aquatic toxicity:

There is a high probability that the product is not acutely harmful to aquatic organisms.

Toxicity to fish

Information on: Imazapyr

LC50 (96 h) >100PPM, Oncorhynchus mykiss (static)

LC50 (96 h) >100 ppm, Lepomis macrochirus (static)

Aquatic invertebrates

Information on: Imazapyr

EC50 (24 h) > 100 ppm, Daphnia magna

Aquatic plants

Information on: Imazapyr

EC50 (96 h) >1 ppm, Selenastrum capricornutum (static)

EC50 (14 d) 24, Lemna gibba

Assessment of terrestrial toxicity

With high probability not acutely harmful to terrestrial organisms.

Other terrestrial non-mammals

Information on: imazapyr

LC50, Anas platyrhynchos

With high probability not acutely harmful to terrestrial organisms.

LD50 > 100 ug/bee, Apis mellifera

With high probability not acutely harmful to terrestrial organisms.

Persistence and degradability

Assessment biodegradation and elimination (H2O)

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The product has not been tested. The statement has been derived from the properties of the individual components.

Elimination information

Not readily biodegradable (by OECD criteria).

Bioaccumulative potential

Assessment bioaccumulation potential

The product has not been tested. The statement has been derived from the properties of the individual components.

Assessment bioaccumulation potential

Information on: Imazapyr

Does not accumulate in organisms.

Mobility in soil

Assessment transport between environmental compartments

The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: Imazapyr

*The substance will not evaporate into the atmosphere from the water surface.
Following exposure to soil, the product trickles away and can - dependant on degradation - be transported to deeper soil areas with larger water loads.*

Additional information

Other ecotoxicological advice:

The ecological data given are those of the active ingredient. Do not release untreated into natural waters.

13. Disposal considerations

Waste disposal of substance:

Pesticide wastes are regulated. Improper disposal of excess pesticide, spray mix or rinsate is a violation of federal law. If pesticide wastes cannot be disposed of according to label instructions, contact the State Pesticide or Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container disposal:

Rinse thoroughly at least three times (triple rinse) in accordance with EPA recommendations. Consult state or local disposal authorities for approved alternative procedures such as container recycling. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

RCRA:

This product is not regulated by RCRA.

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14. Transport Information

Land transport USDOT

Not classified as a dangerous good under transport regulations

Sea transport IMDG

Hazard class: 9
Packing group: III
ID number: UN 3082
Hazard label: 9, EHSM
Marine pollutant: YES
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID,
N.O.S. (contains IMAZAPYR)

Air transport IATA/ICAO

Hazard class: 9
Packing group: III
ID number: UN 3082
Hazard label: 9, EHSM
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID,
N.O.S. (contains IMAZAPYR)

15. Regulatory Information

Federal Regulations

Registration status:

Crop Protection TSCA, US released / exempt

Chemical TSCA, US blocked / not listed

EPCRA 311/312 (Hazard categories): Acute; Chronic

State regulations

CA Prop. 65:

There are no listed chemicals in this product.

NFPA Hazard codes:

Health : 1 Fire: 1 Reactivity: 1 Special:

Labeling requirements under FIFRA

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from

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the classification criteria and hazard information required for safety data sheets, and workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label.

CAUTION:

KEEP OUT OF REACH OF CHILDREN.

Avoid contact with the skin, eyes and clothing.

Avoid inhalation of mists/vapours.

16. Other Information

SDS Prepared by:

BASF NA Product Regulations

SDS Prepared on: 2014/09/25

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

IMPORTANT: WHILE THE DESCRIPTIONS, DESIGNS, DATA AND INFORMATION CONTAINED HEREIN ARE PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE , IT IS PROVIDED FOR YOUR GUIDANCE ONLY. BECAUSE MANY FACTORS MAY AFFECT PROCESSING OR APPLICATION/USE, WE RECOMMEND THAT YOU MAKE TESTS TO DETERMINE THE SUITABILITY OF A PRODUCT FOR YOUR PARTICULAR PURPOSE PRIOR TO USE. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS. IN NO CASE SHALL THE DESCRIPTIONS, INFORMATION, DATA OR DESIGNS PROVIDED BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE. FURTHER, YOU EXPRESSLY UNDERSTAND AND AGREE THAT THE DESCRIPTIONS, DESIGNS, DATA, AND INFORMATION FURNISHED BY OUR COMPANY HEREUNDER ARE GIVEN GRATIS AND WE ASSUME NO OBLIGATION OR LIABILITY FOR THE DESCRIPTION, DESIGNS, DATA AND INFORMATION GIVEN OR RESULTS OBTAINED, ALL SUCH BEING GIVEN AND ACCEPTED AT YOUR RISK.
END OF DATA SHEET



HYDROTHOL® 191

AQUATIC ALGICIDE AND HERBICIDE

For algae and aquatic plant control in quiescent, slow moving, and flowing water aquatic sites.

ACTIVE INGREDIENT:

Mono(N,N-dimethylalkylamine) salt of endothall* 53.0%

OTHER INGREDIENTS: 47.0%

TOTAL 100.0%

*7-oxabicyclo [2.2.1] heptane-2,3-dicarboxylic acid equivalent 23.36%

Contains 2 lbs. endothall acid per gallon

KEEP OUT OF REACH OF CHILDREN DANGER PELIGRO

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.)

FIRST AID

IF IN EYES:

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

IF ON SKIN OR CLOTHING:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for 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 by a 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 ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.
- Call a poison control center or doctor for treatment advice.

HOT LINE NUMBER: Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 866-673-6671 (Rocky Mountain Poison Control Center) for emergency medical treatment information.

See inside for additional precautionary statements.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

EPA Registration No. 70506-175

Batch/Lot No. _____

Net Contents: _____



United Phosphorus, Inc.
630 Freedom Business Center, Suite 402
King of Prussia, PA 19406
1-800-438-6071

PRODUCT INFORMATION

Hydrothol 191 is a liquid concentrate soluble in water and is a highly effective aquatic algicide and herbicide. Apply when target algae and plants are actively growing. Note: Susceptibility of algae may vary due to subspecies, strains or environmental conditions. Dosage rates are measured in parts per million (ppm) endothal acid.

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS DANGER

CORROSIVE. CAUSES IRREVERSIBLE EYE DAMAGE AND SKIN BURNS. MAY BE FATAL IF SWALLOWED, OR ABSORBED THROUGH SKIN. HARMFUL IF INHALED. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING. AVOID BREATHING VAPOR OR SPRAY MIST.

Personal Protective Equipment (PPE)

Mixers, loaders, applicators and other handlers must wear:

- Coveralls over long-sleeved shirt and long pants,
Exception: When the product is applied in a manner in which the applicator will have no contact with the pesticide (such as direct metering or subsurface injection), coveralls need not be worn.
- Chemical-resistant footwear plus socks,
- Chemical-resistant gloves made of any waterproof material,
- Chemical-resistant headgear for overhead exposure,
- Protective eyewear,
- Chemical-resistant apron when mixing, loading, or cleaning equipment,
- NIOSH-approved respirator with a dust/mist filter with MSHA/NIOSH approval number prefix TC-21C or any N, R, P, or HE filter.

Exception: During application, the respirator need not be worn, provided that the pesticide is applied in a manner (such as direct metering or subsurface release from the rear of a vessel that is moving into the wind) such that the applicator will have no contact with the pesticide.

See Engineering Controls for additional requirements.

User Safety Requirements:

Follow the manufacturers' instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Discard clothing or other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

Engineering Controls:

When mixers and loaders use a closed system designed by the manufacturer to enclose the pesticide to prevent it from contacting handlers or other people AND the system is functioning properly and is used and maintained in accordance with the manufacturers written operating instructions, the handlers need not wear a respirator, provided the required respirator is immediately available for use in an emergency such as a spill or equipment breakdown.

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)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

User should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

Do not contaminate water by cleaning of equipment or disposal of equipment washwaters.

This pesticide is highly toxic to fish and aquatic invertebrates. This pesticide is toxic to wildlife.

Treatment of algae and aquatic plants can result in oxygen loss from decomposition of dead algae and plants. This loss can cause fish suffocation. Water bodies containing very high algae or plant density should be treated in sections to prevent suffocation of fish.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift.

- For quiescent or slow moving water treatments: Waters treated with Hydrothol 191 may be used for swimming, fishing, and irrigating turf, ornamental plants and crops immediately after treatment with the following exceptions: Do not use the Hydrothol 191 treated water to irrigate the following for 7 days after the treatment: annual nursery or greenhouse crops including hydroponics and newly seeded or transplanted annual crops, newly seeded or transplanted ornamentals, and newly sodded or seeded turf. Do not use treated water for animal consumption within the following periods:
0.3 ppm – 7 days after application
3.0 ppm – 14 days after application
5.0 ppm – 25 days after application
- For flowing water treatments: Waters treated with Hydrothol 191 may be used for swimming, fishing, livestock watering, and irrigating turf, ornamental plants and crops immediately after treatment with the following exceptions: Do not use the Hydrothol 191 treated water to irrigate the following: annual nursery or greenhouse crops including hydroponics and newly seeded or transplanted annual crops, newly seeded or transplanted ornamentals, and newly sodded or seeded turf.
- Phytotoxicity is not expected on plants or crops irrigated with Hydrothol 191 treated water, however, all species and cultivars (varieties) have not been tested.
- Undiluted Hydrothol 191 may be injurious to crops, grass, ornamentals or other foliage.
- Do not use Hydrothol 191 treated water for chemigation as interactions between Hydrothol 191 and other pesticides and fertilizers are not known.
- Do not use Hydrothol 191 in waters containing Koi or hybrid goldfish. Hydrothol 191 is not intended for use in small volume garden pond systems.
- Fish may be killed by dosages in excess of 0.3 parts per million (ppm).
- Do not use Hydrothol 191 in brackish or saltwater.
- Wash out spray equipment with water after each operation.
- Avoid contact of spray concentrate (product) directly or by drift with non-target plants or crops as injury may result.
- Do not treat more than 10% of the area at one time with doses in excess of 1 ppm.

HOW TO APPLY:

Hydrothol 191 is a contact algicide and herbicide. Apply when target algae and plants are present. Hydrothol 191 should be sprayed on the water or injected below the water surface. It may be applied as a concentrate or diluted with water depending on the equipment. Hydrothol 191 can be applied to floating algae mats as a surface application. In instances where the algae or plant(s) to be controlled is an exposed surface problem (i.e. some of the broad-leaved pond weeds) coverage is important. For best results, apply the concentrate with the least amount of water compatible with the application equipment.

Drinking Water (Potable Water)

Consult with appropriate state or local water authorities before applying this product to public waters. State or local agencies may require permits.

The drinking water (potable water) restrictions on this label are to ensure that consumption of water by the public is allowed only when the concentration of endotoxin acid in the water is less than the MCL (Maximum Contamination Level) of 0.1 ppm. Applicators should consider the unique characteristics of the treated waters to assure that endotoxin acid concentrations in potable drinking water do not exceed 0.1 ppm at the time of consumption.

For Lakes, Ponds, and other Quiescent Water Bodies:

- For Hydrothol 191 applications, the drinking water setback distance from functioning potable water intakes in the treated water body must be greater than or equal to 600 feet.
- Note: Existing potable water intakes that are no longer in use, such as those replaced by a connection to a municipal water system or a potable water well, are not considered to be functioning potable water intakes.

For Irrigation Canals and other Flowing Water Bodies:

- Applicator is responsible to assure that treated water does not enter potable water intakes. For Hydrothol 191 applications, potable water intakes must be closed when treated water is present at the intake. In the event the water intake cannot be closed, treatments must only be made downstream from the intake in order to assure Hydrothol 191 treated water does not enter the potable water system.

QUIESCENT OR SLOW MOVING

WATER TREATMENTS:

SURFACE OR INJECTED APPLICATIONS

Hydrothol 191 use is limited to algae and the following plants: Hygrophylla*, Vallisneria, Hydrilla, Cabomba*, Bur Reed*, *Elodea canadensis*, and Brazilian Elodea. (* Not for this use in California.)

ALGAE CONTROL: Hydrothol 191 is effective on a broad range of planktonic, filamentous, and branched algae. Note: Susceptibility of algae may vary due to subspecies, strains or environmental conditions. Generally rates of 0.05 to 0.3 ppm (0.6-3.6 pints per acre foot) are effective for the control of algae. Repeat applications when algae reappear and reach treatment levels. Dosages may be increased (from 0.3 to 3.0 ppm) where greater longevity of control is desired or to improve efficacy on species that prove difficult to control. Due to the potential for fish toxicity at higher rates, it is suggested that applications above 0.3 ppm be made only by commercial applicators as marginal or sectional treatments.

SUBMERGED AQUATIC PLANTS: Apply Hydrothol 191 at 1 to 5 ppm (1.4 gallons to 6.8 gallons per acre foot) for control of aquatic plants. Hydrothol 191 is for use on the following aquatic plants: Hygrophylla*, Vallisneria, Hydrilla, Cabomba*, Bur Reed*, *Elodea canadensis*, and Brazilian Elodea. (* Not for this use in California.) Due to potential fish toxicity, Hydrothol 191 use for submerged aquatic plant control is suggested to be made only by commercial applicators as marginal or sectional treatments. Use application rates over 1.0 ppm only on very narrow margins or in areas where some fish kill is not objectionable.

RATE OF APPLICATION:

Algae or Plant	Rate ppm endotoxin acid	Amount of Hydrothol 191 per Acre Ft.
Algae Planktonic, Filamentous, Branched (Use in California limited to Cladophora, Pithophora, Spirogyra, Chara)	0.05-3.0	0.6-36 pints
Aquatic Plants		
Bur Reed*	2-5	2.7-6.8 gals.
Cabomba*†	2-5	2.7-6.8 gals.
Brazilian Elodea	2-5	2.7-6.8 gals.
Elodea Canadensis	2-5	2.7-6.8 gals.
Hydrilla	1-5	1.4-6.8 gals.
Hygrophylla*†	2-5	2.7-6.8 gals.
Vallisneria	2-5	2.7-6.8 gals.

* Not for this use in California

† Suppression only

FLOWING WATER TREATMENTS
(WITH THE EXCEPTION OF IRRIGATION CANALS):
DRIP OR METERING SYSTEMS

For algae and aquatic plant control in flowing water, Hydrothol 191 recommended use rates can be found in the following chart. Apply Hydrothol 191 in a manner to achieve the desired rate and adequate mixing so Hydrothol 191 is distributed throughout the entire water column. Adequate concentration (rate) and exposure time (length of treatment) will impact Hydrothol 191 efficacy on the target algae and plant species. Although Hydrothol 191 is a contact algicide and herbicide, adequate exposure time is critical. The rates and the length of treatment are guidelines to control the target species. The following rate chart has been developed based on Concentration Exposure Time (CET) data for Hydrothol 191. The CET concept allows rates and the length of exposure to be adjusted for different treatment scenarios.

RATE OF APPLICATION:

Target Species	Rate ppm endothall acid	Duration	Restrictions
Algae: Planktonic, Filamentous, Branched (Use in California limited to Cladophora, Pithophora, Spirogyra, Chara)	0.05 – 3.0	6 – 120 hours	A maximum of 30 ppm per growing season, not to exceed 5 ppm per application.
Plants: Bur Reed* Cabomba*† Coontail Elodea Canadensis Hydrilla Hygrophila*† Milfoil (Myriophyllum spp.) Naiad (Najas spp.) Pondweed (Potamogeton spp.) Water Stargrass* Vallisneria Zannichellia	0.2 – 5	6 – 120 hours	Do not apply more than a total of 5 ppm within a 7-day interval. There is no Pre-harvest Interval (PHI) for crops irrigated with treated water.

* Not for this use in California
† Suppression only

To calculate the amount of Hydrothol 191 required for a particular treatment use the following formula:

$$[\text{Cubic Feet per Second (CFS)} \times \text{Length of Treatment (hrs.)} \times \text{Rate (ppm)}] \times 0.11198 = \text{Gallons of Hydrothol 191 Needed for Treatment}$$

To calculate the amount of Hydrothol 191 to be applied per hour use the following formula:

$$\text{Gallons of Hydrothol 191 per hour} = \frac{\text{Total Gallons of Hydrothol 191}}{\text{Length of Treatment (hrs.)}}$$

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Store in the original container. Do not store in a manner where cross-contamination with other pesticides, fertilizers, food or feed could occur. In the event of a spill during handling or storage, absorb with sand or other inert material and dispose of absorbent in accordance with the Pesticide Disposal instructions listed below.

Pesticide Disposal: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Handling:

(for Nonrefillable containers)

Nonrefillable container. Do not reuse or refill this container.

Triple rinse or pressure rinse container promptly after emptying.

For containers 5 gallons or less:

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Or

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

For containers more than 5 gallons:

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

Or

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 PSI for at least 30 seconds. Pour or pump rinsate into application equipment or rinsate collection system. Drain for 10 seconds after the flow begins to drip.

Then offer for recycling if available or 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.

(for Refillable containers)

Refillable container. Refill this container with pesticide only. Do not use this container for any other purpose.

Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Then offer for recycling if available or reconditioning if appropriate or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

EMERGENCY TELEPHONE NUMBERS

CHEMTREC: (800) 424-9300

MEDICAL: (866) 673-6671

Rocky Mountain Poison Control Center

IMPORTANT INFORMATION READ BEFORE USING PRODUCT

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product reflect the opinion of experts based on field use and tests, and must be followed carefully. It is impossible to eliminate all risks associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of United Phosphorus, Inc. or Seller. Handling, storage, and use of the product by Buyer or User are beyond the control of United Phosphorus, Inc. and Seller. All such risks shall be assumed by Buyer and User, and Buyer and User agree to hold United Phosphorus, Inc. and Seller harmless for any claims relating to such factors.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, UNITED PHOSPHORUS, INC. AND SELLER MAKE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ON THIS LABEL.

To the extent consistent with applicable law, United Phosphorus, Inc. or Seller shall not be liable for any incidental, consequential or special damages resulting from the use or handling of this product and **THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF UNITED PHOSPHORUS, INC. AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF UNITED PHOSPHORUS, INC. OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

United Phosphorus, Inc. and Seller offer this product, and Buyer and User accept it, subject to the foregoing conditions of sale and limitations of warranty and of liability, which may not be modified except by written agreement signed by the duly authorized representative of United Phosphorus, Inc.

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Rev. 9/15/11

70506-175(092011-4046)



Material Safety Data Sheet

United Phosphorus, Inc.

NFPA	PPE		

Issued Date 07-Feb-2007

Revision Date 23-Dec-2010

Revision Number: 6

1. PRODUCT AND COMPANY IDENTIFICATION

UPI
 630 Freedom Business Center
 Suite 402
 King of Prussia, PA 19406

Emergency Telephone Number
 Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
 Medical: Rocky Mountain Poison Control Center
 (866) 673-6671 (24hrs)

Company Information
 UPI

Contact Information
 Customer Service
 R&D Technical Service

Phone Number
 1-800-438-6071
 610-878-6100

Available Hrs
 8:00 am to 5:00 pm EST
 8:00 am - 5:00 pm (EST)

Product Name Hydrothol® 191 Aquatic algicide and herbicide
EPA Reg # 70506-175
Recommended Use Aquatic herbicide algicide
Product Code 12-174

2. HAZARDS IDENTIFICATION

Emergency Overview

Causes irreversible eye damage
 May be fatal if swallowed.
 May be fatal if absorbed through skin
 Harmful by inhalation
 Causes severe skin irritation

DANGER!

Appearance Dark yellow, Light brown.

Physical State Liquid.

Odor Slight chlorine.

Potential Health Effects

- Inhalation
- Skin contact

Eyes
Skin
Inhalation
Ingestion

Risk of serious damage to eyes. Causes irreversible eye damage..
 Severely irritating to the skin. Prolonged contact can result in redness and blistering of skin..
 Slightly toxic if inhaled.
 Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients Name

Chemical Name	CAS-No	Weight %	OSHA PEL
Mono(N,N-diethylalkylamine)salt of endothall	66330-88-9	53	N/A

4. FIRST AID MEASURES

Eye Contact

Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye.
 Call a poison control center or doctor for treatment advice.

Skin Contact

Take off contaminated clothing.
 Rinse skin immediately with plenty of water for 15-20 minutes.
 Call poison control center or doctor for treatment advice.

Inhalation

Move person to fresh air.
 If person is not breathing, call 911 or an ambulance, then give artificial respiration.
 Call a poison control center or doctor for further treatment advice.

Ingestion

Call a physician or Poison Control Center immediately
 Have person sip a glass of water if able to swallow
 Do not induce vomiting unless told to do so by a poison control center or doctor
 Never give anything by mouth to an unconscious person

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
Engineering Controls	Investigate engineering techniques to reduce exposures. Local mechanical exhaust ventilation is preferred. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems. .
Personal Protective Equipment	
Eye/face Protection	Goggles. Face-shield. Avoid contact with eyes.
Skin Protection	Chemical resistant gloves. waterproof gloves. Long sleeved clothing. Long pants.
Respiratory Protection	Where airborne exposure is likely, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. If exposures cannot be kept at a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure, use an approved full face positive-pressure, self-contained breathing apparatus. Respiratory protection programs must comply with 29 CFR 1910.134. . Mixers & loaders: A NIOSH approved dust mist filtering respirator with MSA/NIOSH approval number prefix TC-21C or a NIOSH approved respirator with any N, R, P, or HE filter. .

General Hygiene Considerations

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Dark yellow Light brown	Odor	Slight chlorine
Physical State	Liquid	pH	No data available
Boiling Point/Range	100°C	Melting Point/Range	Not available
Specific Gravity	1.044 @25 C	Solubility	>50 g/100 ml
Evaporation Rate	Not available	Vapor Pressure	9.45 X 10 ⁻⁶ Torr(Salt)
Vapor Density	Not available	VOC Content	Not available
Viscosity	100 cps@ 25 C	Molecular Weight	No data available
Bulk Density	No data available	Percent Solids	Not available
Percent Volatiles	47%		

10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions
Conditions to Avoid	Extreme temperatures.
Incompatible Materials	No materials to be especially mentioned
Hazardous Decomposition Products	Extreme temperatures may convert endothall product to endothall anhydride, a strong vessicant, causing blistering of eyes, mucous membranes and skin. .
Possibility of Hazardous Polymerization	Hazardous polymerisation does not occur

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

Single exposure studies indicate:

Oral - Moderately toxic to rats (LD50 233.4 mg/kg)

Dermal - Moderately toxic to rabbits (LD50 480.9 mg/kg)

Inhalation - Slightly toxic to rats (4 hr LC 50 0.7 mg/l)

Skin irritation - Severely irritating to rabbits

Eye irritation - severely irritating to rabbits

No skin allergy was observed in guinea pigs following repeated exposure.

Endothall

Intentional swallowing of 40 ml led to death within 12 hours. Skin allergy was observed in guinea pigs following repeated exposure. Repeated dietary administration (Via gelatin capsules) produced vomiting, diarrhea, sluggish movements, and liver, kidney and blood effects in dogs. Long-term dietary administration to rats and mice produced effects in the glandular stomach. High mortality rates and intestinal tumors considered to be secondary to the effects in the stomach were observed in mice. Long-term application to the skin of mice produced no tumors. No birth defects were observed in the offspring of rats exposed orally during pregnancy, even at dosages that produced adverse effects on the mothers. Skelatal abnormalities were observed in the offspring of rabbits and mice exposed during pregnancy, but only at dosages that produced adverse effects in the mothers. No genetic changes were observed in tests using bacteria, animal cells or animals.

Chronic Toxicity

There are no known carcinogenic chemicals in this product

Carcinogenicity

12. ECOLOGICAL INFORMATION

Ecotoxicity

Endothall Mono-Amine Salt Ecotoxicity

Acute Contact Toxicity Honey Bee (*Apis mellifera*) -
For endothall acid, mono-amine salt, and dipotassium salt
Practically non-toxic

Acute Toxicity Avian
Northern Bobwhite Quail (*Colinus virginianus*) LD50 = 736 mg/kg

Acute Toxicity Freshwater Fish (*static and **flow-thru)
*Bluegill sunfish (*Lepomis macrochirus*), EC50 = 0.94 ppm
*Rainbow trout (*Oncorhynchus mykiss*), EC50 = 0.56 ppm
**Rainbow trout (*Oncorhynchus mykiss*), EC50 = 0.94 ppm
*Cutthroat trout (*Oncorhynchus clarki*), EC50 = 0.18 ppm
*Channel catfish (*Ictalurus punctatus*), EC50 = 0.49 ppm
Fathead minnow (*Pimephales promelas*), EC50 = 0.75 ppm

Acute Toxicity Freshwater Invertebrates (*static)
*Waterflea (*Daphnia magna*), 48hr, EC50 = 0.36 ppm
*Grassshrimp (*Palaemonetes kadiakensis*), 96hr, EC50 = 0.05 ppm
*Scud (*Gammarius lacustris*), 48hr, EC50 = 2.0 ppm
*Scud (*Gammarius lacustris*), 96hr, EC50 = 0.5 ppm
*Giant salmonfly (*Pteronarcys californica*), 48hr, EC50 = 3.25 ppm

Acute Toxicity Estuarine/Marine Fish (** Flow-thru)
**Sheepshead minnow (*Cyrinodon variegatus*), 96hr, EC50 = 3.5ppm

Acute Toxicity Estuarine/Marine Invertebrates (** Flow-thru)
**Mysid shrimp (*Mysidopsis bahia*), 96hr, EC50 = 2.2 ppm
**Eastern oyster (*Crassostrea virginica*), shell deposition,
96hr, EC50 = 0.6 ppm

Chem Fate: Active ingredient (technical) -

No degradation was observed in irradiated or dark water during a 30-day test period at pH 7 or 9. Rapid degradation was observed in irradiated, but not dark, water at pH 5 (Half-life <24 hours). This material adsorbed readily from aqueous solution on to Crosby silt loam. It is not expected to bioaccumulate with bioaccumulation factors (BCF) of 10 for mosquito fish and 0.003- 0.008 for bluegills..

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide or rinsate is a violation of Federal law. If the wastes cannot be disposed of by use or according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance. .

Contaminated Packaging

Non refillable container. Do not reuse this container. . Triple rinse or pressure rinse promptly after emptying. . Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Then offer for recycling if available or 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. .

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. . Then offer for recycling if available or 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

DOT

Proper Shipping Name	Pesticides, liquid, toxic. n.o.s. (Endothal)
Hazard Class	6.1
UN-No	2902
Packing Group	PG III
Reportable Quantity (RQ):	1,000 lbs (endothall)

ICAO

UN-No	2902
Proper Shipping Name	Pesticide, liquid, toxic, n.o.s. (Endothall)
Hazard Class	6.1
Packing Group	PG III

IATA

UN-No	2902
Proper Shipping Name	Pesticide, liquid, toxic, n.o.s. (Endothall)
Hazard Class	6.1
Packing Group	PG III
ERG Code	6 L

IMDG/IMO

Proper Shipping Name	Pesticide, liquid, toxic, n.o.s. (Endothall)
Hazard Class	6.1
UN-No	2902
Packing Group	PG III
EmS No.	F-A, S-A

15. REGULATORY INFORMATION

International Inventories

12-174 - Hydrothol® 191 Aquatic algicide and herbicide

USA

Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and and Title 40n of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazardous Categorization

Chronic Health Hazard	No
Acute Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product does not contain any HAPs.

CERCLA

RCRA

Pesticide Information

State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

State Right-to-Know

International Regulations

Mexico - Grade Not available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

Not determined

16. OTHER INFORMATION

Revision Date 23-Dec-2010

Revision Summary

Update section 13 Update section 8

UPI, Inc. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with other materials or in any process. Further, since the conditions and methods of use are beyond the control of UPI, Inc. UPI, Inc. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

End of MSDS



Navigate®

A SELECTIVE HERBICIDE
FOR CONTROLLING CERTAIN
UNWANTED AQUATIC PLANTS

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. READ ENTIRE LABEL BEFORE USING THIS PRODUCT. USE STRICTLY IN ACCORDANCE WITH LABEL PRECAUTIONARY STATEMENTS AND DIRECTIONS.

GENERAL PRECAUTIONS AND RESTRICTIONS

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. Do not enter or allow others to enter the treated area until dusts have settled. Do not use in or near a greenhouse.

OXYGEN RATIO

Fish breathe oxygen in the water and a water/oxygen ratio must be maintained. Decaying weeds use up oxygen, but during the period when this product should be used, the weed mass is fairly sparse and the weed decomposition rate is slow enough so that the water/oxygen ratio is not disturbed by treating the entire area at one time.

If treatments must be applied later in the season when the weed mass is dense and repeat treatments are needed, spread granules in lanes, leaving buffer strips which can then be treated when vegetation in treated lanes has disintegrated. During the growing season, weeds decompose in a 2 to 3 week period following treatment. Buffer lanes should be 50 to 100 feet wide. Treated lanes should be as wide as the buffer strips. (See illustration to the right.)



WATER pH

Best results are generally obtained if the water to be treated has a pH less than 8. A pH of 8 or higher may reduce weed control. If regrowth occurs within a period of 6 to 8 weeks, a second application may be needed.

PERMIT TO USE CHEMICALS IN WATER

In many states, permits are required to control weeds by chemical means in public water. If permits are required, they may be obtained from the Chief, Fish Division, State Department of Conservation or the State Department of Public Health.

GENERAL INFORMATION

This product is formulated on special heat treated attaclay granules that resist rapid decomposition in water, sink quickly to lake or pond bottoms and release the weed killing chemical into the critical root zone area.

This product is designed to selectively control the weeds listed on the label. While certain other weed may be suppressed, control may be incomplete. Reduced control may occur in lakes where water replacement comes from bottom springs.

WHEN TO APPLY

For best results, spread this product in the spring and early summer, during the time weeds start to grow. If desired, this timing can be checked by sampling the lake bottom in areas heavily infested with weeds the year before.

If treatments are delayed until weeds form a dense mat or reach the surface, two treatments may be necessary. Make the second treatment when weeds show signs of recovery. Treatments made after September may be less effective depending upon water temperature and weed growth. Occasionally, a second application will be necessary if heavy regrowth occurs or weeds reinfest from untreated areas.

EPA REG. NO. 228-378-8959
EPA EST. NO. 42291-GA-1

ACTIVE INGREDIENT:

Butoxyethyl Ester of 2,4-Dichlorophenoxyacetic Acid*27.6%
OTHER INGREDIENTS:.....72.4%
TOTAL:.....100.0%

*Isomer specific by AOAC Method, Equivalent to 2,4-Dichlorophenoxyacetic Acid.....19%

**KEEP OUT OF REACH OF
CHILDREN
CAUTION**

*See Inside For
Additional Precautionary Statements*

Manufactured for:

ab applied biochemists

W175N11163 Stonewood Dr. Ste. 234,
Germantown, WI 53022 • 1-800-558-5106
www.appliedbiochemists.com

HOW TO APPLY

FOR LARGE AREAS: Use a fertilizer spreader or mechanical seeder such as the Gerber or Gandy or other equipment capable of uniformly applying this product. Before spreading any chemical, calibrate your method of application to be sure of spreading the proper amount. When using boats and power equipment, you must determine the proper combination of (1) boat speed, (2) rate of delivery from the spreader, and (3) width of swath covered by the granules.

FOR SMALL AREAS (Around Docks or Isolated Patches of Weeds): Use a portable spreader such as the Cyclone seeder or other equipment capable of uniformly applying this product. Estimate or measure out the area you want to treat. Weigh out the amount of material needed and spread this uniformly over the area. More uniform coverage is obtained by dividing the required amount in two and covering the area twice, applying the second half at right angles to the first.

Use the following formula to calibrate your spreader's delivery in pounds of this product per minute.

$$\frac{\text{Miles per hour} \times \text{spreader width} \times \text{pounds per acre}}{495}$$

Example: To apply 100 pounds of this product per acre using a spreader that covers a 20 foot swath from a boat traveling at 4 miles per hour, set the spreader to deliver 16 pounds of this product per minute.

$$\frac{4 \text{ mph} \times 20 \text{ feet} \times 100 \text{ lbs./A}}{495}$$

AMOUNTS TO USE

Rates of application vary with resistance of weed species to the chemical, density of weed mass at time of treatment, stage of growth, water depth, and rate of water flow through the treated area. Use the higher rate for dense weeds, when water is more than 8 feet deep and where there is a large volume turnover.

SUSCEPTIBLE WEEDS

Water Milfoil (*Myriophyllum* spp.)

Water stargrass (*Heteranthera dubia*)

SLIGHTLY TO MODERATELY RESISTANT WEEDS

Bladderwort (*Utricularia* spp.)

White water lily (*Nymphaea* spp.)

Yellow water lily or spatterdock* (*Nuphar* spp.)

Water shield (*Brasenia* spp.)

Water chestnut (*Trapa natans*)

Coontail* (*Ceratophyllum demersum*)

*Repeat treatments may be needed.

AQUATIC USE PRECAUTIONS AND RESTRICTIONS

FLOATING AND EMERGENT WEEDS

Maximum of 4.0 lbs 2,4-D ae or 21 lbs of this product per surface acre per application. Limited to 2 applications per season. Minimum of 21 days between applications. Spot treatments are permitted.

Apply to emergent aquatic weeds in ponds, lakes, reservoirs, marshes, bayous, drainage ditches, non-irrigation canals, rivers, and streams that are quiescent or slow moving.

Coordination and approval of local and state authorities may be required, either by letter of agreement or issuance of special permits for aquatic applications.

Water Use for Floating and Emergent Weeds

1. Water for irrigation or sprays:

A. If treated water is intended to be used only for crops or non-crop areas that are labeled for direct treatment with 2,4-D such as pastures, turf, or cereal grains, the treated water may be used to irrigate and/or mix sprays for these sites at anytime after the 2,4-D aquatic application.

B. Due to potential phytotoxicity considerations, the following restrictions are applicable:

If treated water is intended to be used to irrigate or mix sprays for plants grown in commercial nurseries and greenhouses; and other plants or crops that are not labeled for direct treatment with 2,4-D, the water must not be used unless one of the following restrictions has been observed:

- A setback distance from functional water intake(s) of greater than or equal to 600 feet was used for the application, or
- A waiting period of 7 days from the time of application has elapsed, or
- An approved assay indicates that the 2,4-D concentration is 100 ppb (0.1 ppm) or less at the water intake. Wait at least 3 days after application before initial sampling at water intake.

2. Drinking water (potable water):

A. Consult with appropriate state or local water authorities before applying this product to public waters. State or local agencies may require permits. The potable water use restrictions on this label are to ensure that consumption of water by the public is allowed only when the concentration of 2,4-D in the water is less than the MCL (Maximum Contaminant Level) of 70 ppb. Applicators should consider the unique characteristics of the treated waters to assure that 2,4-D concentrations in potable water do not exceed 70 ppb at the time of consumption.

B. For floating and emergent weed applications, the drinking water setback distance from functioning potable water intakes is greater than or equal to 600 feet.

C. If no setback distance of greater than or equal to 600 feet is used for application, applicators or the authorizing organization must provide a drinking water notification prior to a 2,4-D application to the party responsible for public water supply or to individual private water users. Notification to the party responsible for a public water supply or to individual private water users must be done in a manner to assure that the party is aware of the water use restrictions when this product is applied to potable water.

The following is an example of a notification via posting, but other methods of notification which convey the above restrictions may be used and may be required in some cases under state or local law or as a condition of a permit.

Example: Posting notification should be located every 250 feet including the shoreline of the treated area and up to 250 feet of shoreline past the application site to include immediate public access points. Posting must include the day and time of application. Posting may be removed if analysis of a sample collected at the intake 3 or more days following application shows that the concentration in the water is less than 70 ppb (100 ppb for irrigation or sprays), or after 7 days following application, whichever occurs first.

Text of notification: Wait 7 days before diverting functioning surface water intakes from the treated aquatic site to use as drinking water, irrigation, or sprays, unless water at functioning drinking water intakes is tested at least 3 days after application and is demonstrated by assay to contain not more than 70 ppb 2,4-D (100 ppb for irrigation or sprays). Application Date: _____ Time: _____

D. Following each application of this product, treated water must not be used for drinking water unless one of the following restrictions has been observed:

- A setback distance from functional water intake(s) of greater than or equal to 600 feet was used for the application, or
- A waiting period of at least 7 days from the time of application has elapsed, or
- An approved assay indicates that the 2,4-D concentration is 70 ppb (0.07 ppm) or less at the water intake. Sampling for drinking water analysis should occur no sooner than 3 days after 2,4-D application. Analysis of samples must be completed by a laboratory that is certified under the Safe Drinking Water Act to perform drinking water analysis using a currently approved version of analytical Method Number 515, 555, other methods for 2,4-D as may be listed in Title 40 CFR, Part 141.24, or Method Number 4015 (immunoassay of 2,4-D) from U.S. EPA Test Methods for Evaluating Solid Waste SW-846.

E. Note: Existing potable water intakes that are no longer in use, such as those replaced by a connection to a municipal water system or a potable water well, are not considered to be functioning potable water intakes.

F. Drinking water setback distances do not apply to terrestrial applications of 2,4-D adjacent to water bodies with potable water intakes.

3. Swimming:

A. Do not swim in treated water for a minimum of 24 hours after application.

B. Users must provide notification prior to performing a 2,4-D BEE application. Notification to the party responsible for the public swimming area or to individual private users must be done in a manner to assure that the party is aware of the water use swimming restrictions when this product is applied to water. The following is an example of a notification via posting, but other methods of notification which convey the above restrictions may be used and may be required in some cases under state or local law or as a condition of a permit.

Example: Posting notification should be located every 250 feet including the shoreline of the treated area and up to 250 feet of shoreline past the application site to include immediate public access points.

Text of notification: Do not swim in treated water for a minimum of 24 hours after application. Application Date: _____ Time: _____

4. Except as stated above, there are no restrictions on using water from treated areas for swimming, fishing, watering livestock or domestic purposes.

SUBMERSED WEEDS

Maximum of 10.8 lbs 2,4-D ae or 56.8 lbs of this product per acre-foot per application.

Limited to 2 applications per season.

Apply to aquatic weeds in ponds, lakes, reservoirs, marshes, bayous, drainage ditches, non-irrigation canals, rivers, and streams that are quiescent or slow moving. Do not apply within 21 days of previous application.

When treating moving bodies of water, applications must be made while traveling upstream to prevent concentration of 2,4-D downstream from the application.

Coordination and approval of local and state authorities may be required, either by letter of agreement or issuance of special permits for such use.

Surface Area	Average Depth	For typical conditions 2 ppm 2,4-D ae/acre-foot	For difficult conditions* 4 ppm 2,4-D ae/acre-foot
1 Acre	1 Foot	5.4 pounds (28.4 lbs of this product)	10.8 pounds (56.8 lbs of this product)
	2 Feet	10.8 pounds (56.8 lbs of this product)	21.6 pounds (110.8 lbs of this product)
	3 Feet	16.2 pounds (85.2 lbs of this product)	32.4 pounds (170.5 lbs of this product)
	4 Feet	21.6 pounds (110.8 lbs of this product)	43.2 pounds (227.3 lbs of this product)
	5 Feet	27.0 pounds (142.1 lbs of this product)	54.0 pounds (284.2 lbs of this product)

*Examples include spot treatment of pioneer colonies of Eurasian Water Milfoil and certain difficult to control aquatic species.

Note: The same "Water for Irrigation or Spray" restrictions for Floating and Emergent Weeds apply to Submersed Weeds.

Water Use for Submersed Weeds

1. Water for irrigation or sprays:

A. If treated water is intended to be used only for crops or non-crop areas that are labeled for direct treatment with 2,4-D such as pastures, turf, or cereal grains, the treated water may be used to irrigate and/or mix sprays for these sites at anytime after the 2,4-D aquatic application.

B. Due to potential phytotoxicity considerations, the following restrictions are applicable:

If treated water is intended to be used to irrigate or mix sprays for unlabeled crops, non-crop areas or other plants not labeled for direct treatment with 2,4-D, the water must not be used unless one of the following restrictions has been observed:

- A setback distance described in the Drinking Water Setback Table was used for the application, or,
- A waiting period of 21 days from the time of application has elapsed, or,
- An approved assay indicates that the 2,4-D concentration is 100 ppb (0.1 ppm) or less at the water intake. See Table 3 for the waiting period after application but before taking the initial sampling at water intake.

2. Drinking water (potable water):

A. Consult with appropriate state or local water authorities before applying this product to public waters. State or local agencies may require permits. The potable water use restrictions on this label are to ensure that consumption of water by the public is allowed only when the concentration of 2,4-D in the water is less than the MCL (Maximum Contaminant Level) of 70 ppb. Applicators should consider the unique characteristics of the treated waters to assure that 2,4-D concentrations in potable water do not exceed 70 ppb at the time of consumption.

B. For submersed weed applications, the drinking water setback distances from functioning potable water intakes are provided in Table 2. Drinking Water Setback Distance (on next page).

C. If no setback distance from the Drinking Water Setback Table (Table 2) is to be used for the application, applicators or the authorizing organization must provide a drinking water notification and an advisory to shut off all potable water intakes prior to a 2,4-D application. Notification to the party responsible for a public water supply or to individual private water users must be done in a manner to assure that the party is aware of the water use restrictions when this product is applied to potable water.

The following is an example of a notification via posting, but other methods of notification which convey the above restrictions may be used and may be required in some cases under state or local law or as a condition of a permit.

Example: Posting notification should be located every 250 feet including the shoreline of the treated area and up to 250 feet of shoreline past the application site to include immediate public access points. Posting should include the day and

time of application. Posting may be removed if analysis of a sample collected at the intake no sooner than stated in Table 3 (below) shows that the concentration in the water is less than 70 ppb (100 ppb for irrigation or sprays), or after 21 days following application, whichever occurs first.

Text of notification: Wait 21 days before diverting functioning surface water intakes from the treated aquatic site to use as drinking water, irrigation, or sprays, unless water at functioning drinking water intakes is tested no sooner than (insert days from Table 3) and is demonstrated by assay to contain not more than 70 ppb 2,4-D (100 ppb for irrigation or sprays).

Application Date: _____ Time: _____

D. Following each application of this product, treated water must not be used for drinking water unless one of the following restrictions has been observed:

- A setback distance described in the Drinking Water Setback Distance Table was used for the application, or,
- A waiting period of at least 21 days from the time of application has elapsed, or,
- An approved assay indicates that the 2,4-D concentration is 70 ppb (0.07 ppm) or less at the water intake. Sampling for drinking water analysis should occur no sooner than stated in Table 3. Analysis of samples must be completed by a laboratory that is certified under the Safe Drinking Water Act to perform drinking water analysis using a currently approved version of analytical Method Number 515, 555, other methods for 2,4-D as may be listed in Title 40 CFR, Part 141.24, or Method Number 4015 (immunoassay of 2,4-D) from U.S. EPA Test Methods for Evaluating Solid Waste SW-846.

E. Note: Existing potable water intakes that are no longer in use, such as those replaced by a connection to a municipal water system or a potable water well, are not considered to be functioning potable water intakes.

F. Drinking water setback distances do not apply to terrestrial applications of 2,4-D adjacent to water bodies with potable water intakes.

Application Rate and Minimum Setback Distance (feet) From Functioning Potable Water Intake			
1 ppm*	2 ppm*	3 ppm*	4 ppm*
600	1200	1800	2400

*ppm acid equivalent target water concentration

Minimum Days After Application Before Initial Water Sampling at the Functioning Potable Water Intake			
1 ppm*	2 ppm*	3 ppm*	4 ppm*
5	10	10	14

*ppm acid equivalent target water concentration

3. Swimming:

A. Do not swim in treated water for a minimum of 24 hours after application.

B. Users must provide the following notification prior to performing a 2,4-D BEE application. Notification to the party responsible for the public swimming area or to individual private users must be done in a manner to assure that the party is aware of the water use swimming restrictions when this product is applied to water.

The following is an example of a notification via posting, but other methods of notification which convey the above restrictions may be used and may be required in some cases under state or local law or as a condition of a permit.

Example: Posting notification should be located every 250 feet including the shoreline of the treated area and up to 250 feet of shoreline past the application site to include immediate public access points.

Text of notification: Do not swim in treated water for a minimum of 24 hours after application. Application Date: _____ Time: _____

4. Except as stated above, there are no restrictions on using water from treated areas for swimming, fishing, watering livestock or domestic purposes.

Use of this product in certain portions of California, Oregon, and Washington is subject to the January 22, 2004 Order for injunctive relief in **Washington Toxics Coalition, et al. v. EPA**, C01-0132C, (W.D. WA).

For further information, please refer to <http://www.epa.gov/esspl/litstatus/wtc/index.htm>.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION Causes moderate eye irritation. Avoid contact with eyes or clothing.

PERSONAL PROTECTIVE EQUIPMENT (PPE):

All loaders, applicators, and other handlers must wear:

- long-sleeved shirt and long pants,
- shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users Should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. If pesticide gets on skin, wash immediately with soap and water.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

FIRST AID

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 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 a poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

IF ON SKIN OR CLOTHING

- 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 mouth-to-mouth if possible.
- Call a poison control center or doctor for further treatment advice.

HOT LINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

IN CASE OF EMERGENCY CALL: 1-800-654-6911

ENVIRONMENTAL HAZARDS

Fish breathe dissolved oxygen in the water and decaying weeds also use oxygen. When treating continuous, dense weed masses, it may be appropriate to treat only part of the infestation at a time. For example, apply the product in lanes separated by untreated strips that can be treated after vegetation in treated lanes has disintegrated. During the growing season, weeds decompose in a 2 to 3 week period following treatment. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Waters having limited and less dense weed infestations may not require partial treatments.

For Chemical Spill, Leak, Fire, or Exposure, Call CHEMTREC (800) 424-9300

For Medical Emergencies Only, call (800)-654-6911

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

PESTICIDE STORAGE: Always use original container to store pesticides in a secured warehouse or storage building. Do not store near seeds, fertilizers, insecticides or fungicides. Do not stack more than two pallets high. It is recommended that a SARA Title III emergency response plan be created for storage facilities. Do not transport in the passenger compartment of any vehicle.

PESTICIDE DISPOSAL: Pesticide wastes are toxic. If container is damaged or if pesticide has leaked, clean up all spilled material. Improper disposal of excess pesticide, spray mixtures or rinsate is a violation of Federal law and may contaminate groundwater. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Nonrefillable container. Do not reuse or refill this container. Completely empty container into application equipment, then offer for recycling if available, or dispose of empty container in a sanitary landfill or by incineration or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

WARRANTY DISCLAIMER

The directions for use of this product must be followed carefully. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, (1) THE GOODS DELIVERED TO YOU ARE FURNISHED "AS IS" BY MANUFACTURER OR SELLER AND (2) MANUFACTURER AND SELLER MAKE NO WARRANTIES, GUARANTEES, OR REPRESENTATIONS OF ANY KIND TO BUYER OR USER, EITHER EXPRESS OR IMPLIED, OR BY USAGE OF TRADE, STATUTORY OR OTHERWISE, WITH REGARD TO THE PRODUCT SOLD, INCLUDING, BUT NOT LIMITED TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, USE, OR ELIGIBILITY OF THE PRODUCT FOR ANY PARTICULAR TRADE USAGE. UNINTENDED CONSEQUENCES, INCLUDING BUT NOT LIMITED TO INEFFECTIVENESS, MAY RESULT BECAUSE OF SUCH FACTORS AS THE PRESENCE OR ABSENCE OF OTHER MATERIALS USED IN COMBINATION WITH THE GOODS, OR THE MANNER OF USE OR APPLICATION, INCLUDING WEATHER, ALL OF WHICH ARE BEYOND THE CONTROL OF MANUFACTURER OR SELLER AND ASSUMED BY BUYER OR USER. THIS WRITING CONTAINS ALL OF THE REPRESENTATIONS AND AGREEMENTS BETWEEN BUYER, MANUFACTURER AND SELLER, AND NO PERSON OR AGENT OF MANUFACTURER OR SELLER HAS ANY AUTHORITY TO MAKE ANY REPRESENTATION OR WARRANTY OR AGREEMENT RELATING IN ANY WAY TO THESE GOODS.

LIMITATION OF LIABILITY

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, IN NO EVENT SHALL MANUFACTURER OR SELLER BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR FOR DAMAGES IN THEIR NATURE OF PENALTIES RELATING TO THE GOODS SOLD, INCLUDING USE, APPLICATION, HANDLING, AND DISPOSAL MANUFACTURER OR SELLER SHALL NOT BE LIABLE TO BUYER OR USER BY WAY OF INDEMNIFICATION TO BUYER OR TO CUSTOMERS OF BUYER, IF ANY, OR FOR ANY DAMAGES OR SUMS OF MONEY, CLAIMS OR DEMANDS WHATSOEVER, RESULTING FROM OR BY REASON OF, OR ARISING OUT OF THE MISUSE, OR FAILURE TO FOLLOW LABEL WARNINGS OR INSTRUCTIONS FOR USE, OF THE GOODS SOLD BY MANUFACTURER OR SELLER TO BUYER. ALL SUCH RISKS SHALL BE ASSUMED BY THE BUYER, USER, OR ITS CUSTOMERS. BUYER'S OR USER'S EXCLUSIVE REMEDY, AND MANUFACTURER'S OR SELLER'S TOTAL LIABILITY SHALL BE FOR DAMAGES NOT EXCEEDING THE COST OF THE PRODUCT.

If you do not agree with or do not accept any of directions for use, the warranty disclaimers, or limitations on liability, do not use the product, and return it unopened to the Seller, and the purchase price will be refunded.



FOR ANY EMERGENCY, 24 HOURS / 7 DAYS, CALL:	1-800-654-6911 (OUTSIDE USA: 1-423-780-2970)
FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC®:	1-800-424-9300 (OUTSIDE USA: 1-703-527-3887)
FOR ALL MSDS QUESTIONS & REQUESTS, CALL:	1-800-511-MSDS (OUTSIDE USA: 1-423-780-2347)

PRODUCT NAME: AB NAVIGATE

1. PRODUCT AND COMPANY IDENTIFICATION

Supplier
Applied Biochemists (WI)
W175 N11163 Stonewood Drive ,
Suite 234
Germantown, WI, 53022
United States

Telephone: +12622554449
Telefax: +12622554268
Web: www.appliedbiochemists.com

REVISION DATE: 01/31/2012
SUPERCEDES: 02/15/2007

MSDS Number: 000000012610
SYNONYMS:
CHEMICAL FAMILY: None
DESCRIPTION / USE: None established
FORMULA: None established

Manufacturer
Advantis Technologies
1400 Bluegrass Lakes Parkway
Alpharetta, GA 30004
United States of America

2. HAZARDS IDENTIFICATION

OSHA Hazard
Classification:

Moderate eye irritant, Mild skin irritant

Routes of Entry:	Skin Eyes Ingestion
Chemical Interactions:	No known interactions
Medical Conditions Aggravated:	No data available



Human Threshold Response Data

Odor Threshold Not established for product.

Irritation Threshold Not established for product.

Hazardous Materials Identification System / National Fire Protection Association Classifications

<u>Hazard Ratings :</u>	<u>Health</u>	<u>Flammability</u>	<u>Physical / Instability</u>	<u>PPI / Special hazard.</u>
HMIS	2	0	0	
NFPA	2	0	0	

Immediate (Acute) Health Effects

Inhalation Toxicity: Not expected to be irritating. Not expected to be toxic by inhalation.
 Skin Toxicity: May cause mild skin irritation. Not expected to be toxic from dermal contact.
 Eye Toxicity: Contact may cause moderate irritation consisting of transient redness, swelling, and mucous membrane discharge to the conjunctiva. No corneal involvement or visual impairment is expected.
 Ingestion Toxicity: Ingestion may cause irritation of the gastrointestinal tract and gastrointestinal discomfort with any or all of the following symptoms: nausea, vomiting or diarrhea. Slightly toxic if swallowed.
 Acute Target Organ Toxicity: Contact with eyes or skin causes irritation.

Prolonged (Chronic) Health Effects

Carcinogenicity: This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA. However, this product contains crystalline silica and cristobalite. Both of these substances are classified by IARC (International Agency for research on Cancer) as group 1 carcinogens (carcinogenic to humans). The carcinogenicity concern arises from inhaling particles of inhalable size. The crystalline silica and cristobalite are carried in a granular clay carrier which has a particle size greater than 10 microns, which is not respirable. Therefore, this product is not an inhalation hazard and exposure would not be expected to pose a carcinogenic hazard.

Reproductive and Developmental Toxicity: No reproductive or developmental risk to humans is expected from exposure to this product.

Inhalation: There are no known or reported effects from chronic exposure.

Skin Contact: There are no known or reported effects from chronic exposure except for effects (if any) similar to those experienced from acute exposure.



Ingestion: There are no known or reported effects from chronic ingestion except for effects similar to those experienced from single exposure.

Sensitization: This material is not known or reported to be a skin or respiratory sensitizer.

Chronic Target Organ Toxicity: May cause kidney and liver damage based on animal data.

Supplemental Health Hazard Information : No additional health information available.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>CAS OR CHEMICAL NAME</u>	<u>CAS #</u>	<u>% RANGE</u>
2-butoxyethyl-2,4-dichlorophenoxyacetate	1929-73-3	
Bentonite	1302-78-9	
crystalline silica, tridymite	15468-32-3	
CRISTOBALITE (SiO ₂)	14464-46-1	
QUARTZ (SiO ₂)	14808-60-7	

4. FIRST AID MEASURES

General Advice: Call a poison control center or doctor for treatment advice. For 24-hour emergency medical assistance, call Arch Chemical Emergency Action Network at 1-800-654-6911. Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

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



Skin Contact: IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

Eye Contact: IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 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.

Ingestion: 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 a poison control center or doctor. Do not give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flammability Summary (OSHA): The product is not flammable., Not combustible., The substance or mixture is not classified as pyrophoric., Not explosive

Flammable Properties

Flash Point: Not applicable

Fire / Explosion Hazards: Will not burn

Extinguishing Media: Use dry chemical, water fog, carbon dioxide (CO₂), or foam.

Fire Fighting Instructions: In case of fire, use normal fire-fighting equipment and the personal protective equipment recommended in Section 8 to include a NIOSH approved self-contained breathing apparatus. Use water to cool containers.

Hazardous Combustion Products: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

6. ACCIDENTAL RELEASE MEASURES

Personal Protection for Emergency Situations: Use the personal protective equipment recommended in Section 8 and a NIOSH approved self-contained breathing apparatus.

Spill Mitigation Procedures

Air Release: Keep people away from and upwind of spill/leak.

Water Release: If the product contaminates rivers and lakes or drains inform respective authorities.

Land Release: Sweep up and shovel into suitable containers for disposal. Avoid dust generation. After removal, flush contaminated area thoroughly with water. Avoid runoff into storm sewers and ditches which lead to waterways.

Additional Spill Information : Possible need to alert the neighbourhood. Evacuate personnel to safe areas. Use personal protective equipment as required.



7. HANDLING AND STORAGE

Handling: Do not take internally. Avoid contact with skin, eyes and clothing. Upon contact with skin or eyes, wash off with water. Avoid inhalation of dust and fumes.

Storage: Store in a cool, dry and well ventilated place. Isolate from incompatible materials.

Incompatible Materials for Storage: Refer to Section 10, "Incompatible Materials."

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation: Local exhaust ventilation or other engineering controls are normally required when handling or using this product to keep airborne exposures below the TLV, PEL or other recommended exposure limit.

Protective Equipment for Routine Use of Product

Respiratory Protection : Wear a NIOSH approved respirator if levels above the exposure limits are possible., Wear a NIOSH approved N95 respirator.

Skin Protection : Wear impervious gloves to avoid skin contact.

Eye Protection: Use chemical goggles.

Protective Clothing Type: impervious clothing

General Protective Measures: Emergency eyewash should be provided in the immediate work area.

Exposure Limit Data

<u>CHEMICAL NAME</u>	<u>CAS #</u>	<u>Name of Limit</u>	<u>Exposure</u>
crystalline silica, tridymite	15468-32-3	OSHA Z3	
crystalline silica, tridymite	15468-32-3	OSHA Z1	



CRISTOBALITE (SiO ₂)	14464-46-1	OSHA Z3	250 million particles per cubic foot TWA respirable Use ½ the value calculated from the count or mass formulae for quartz., The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable., division by %SiO ₂ +5
CRISTOBALITE (SiO ₂)	14464-46-1	OSHA Z3	10 mg/m ³ TWA respirable Use ½ the value calculated from the count or mass formulae for quartz., Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics: Aerodynamic diameter (unit density sphere): 2; Percent passing selector: 90 Aerodynamic diameter (unit density sphere): 2,5; Percent passing selector: 75 Aerodynamic diameter (unit density sphere): 3,5; Percent passing selector: 50 Aerodynamic diameter (unit density sphere): 5,0; Percent passing selector: 25 Aerodynamic diameter (unit density sphere): 10; Percent passing selector: 0 The measurements under this note refer to the use of an AEC (now NRC) instrument. The respirable fraction of coal dust is determined with an MRE; the figure corresponding to that of 2.4 mg/m ³ in the table for coal dust is 4.5 mg/m ³ ., division by %SiO ₂ +2



CRISTOBALITE (SiO ₂)	14464-46-1	OSHA Z3	30 mg/m ³ TWA Total dust Use ½ the value calculated from the count or mass formulae for quartz., division by %SiO ₂ +2
CRISTOBALITE (SiO ₂)	14464-46-1	ACGIH	0.025 mg/m ³ TWA respirable dust fraction Respirable fraction; see Appendix C, paragraph C.
CRISTOBALITE (SiO ₂)	14464-46-1	ACGIH	0.025 mg/m ³ TWA Respirable fraction
CRISTOBALITE (SiO ₂)	14464-46-1	OSHA Z3	
CRISTOBALITE (SiO ₂)	14464-46-1	OSHA Z1	
QUARTZ (SiO ₂)	14808-60-7	OSHA Z3	8-hour time weighted average
QUARTZ (SiO ₂)	14808-60-7	OSHA Z3	8-hour time weighted average
QUARTZ (SiO ₂)	14808-60-7	OSHA Z3	8-hour time weighted average
QUARTZ (SiO ₂)	14808-60-7	ACGIH	0.025 mg/m ³ TWA respirable dust fraction Respirable fraction; see Appendix C, paragraph C.
QUARTZ (SiO ₂)	14808-60-7	ACGIH	0.025 mg/m ³ TWA Respirable fraction
QUARTZ (SiO ₂)	14808-60-7	OSHA Z1	
QUARTZ (SiO ₂)	14808-60-7	NIOSH-IDLH	25 mg/m ³
QUARTZ (SiO ₂)	14808-60-7	NIOSH-IDLH	50 mg/m ³

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	solid
Form	No data.
Color:	No data.
Odor:	No data.
Molecular Weight:	None established
Specific Gravity :	no data available
pH :	not applicable
Boiling Point:	not applicable
Freezing Point:	no data available



Melting Point:	no data available
Density:	no data available
Bulk Density:	no data available
Vapor Pressure:	no data available
Vapor Density:	not applicable
Viscosity:	no data available
Solubility in Water:	insoluble
Partition coefficient n-octanol/water:	no data available
Evaporation Rate:	no data available
Oxidizing:	None established
Volatiles, % by vol.:	no data available
VOC Content	no data available
HAP Content	Not applicable

10. STABILITY AND REACTIVITY

Stability and Reactivity Summary:	Stable under normal conditions.
Conditions to Avoid:	Heat.
Chemical Incompatibility:	Strong oxidizing agents, Acids and bases
Hazardous Decomposition Products:	Carbon oxides, Sulphur oxides, Hydrogen chloride
Decomposition Temperature:	No data

11. TOXICOLOGICAL INFORMATION

Component Animal Toxicology

Oral LD50 value:

2-butoxyethyl-2,4-dichlorophenoxyacetate LD50 = 831 mg/kg rat

Component Animal Toxicology

Dermal LD50 value:

2-butoxyethyl-2,4-dichlorophenoxyacetate LD50 > 2,000 mg/kg rabbit

Component Animal Toxicology

Inhalation LC50 value:

2-butoxyethyl-2,4-dichlorophenoxyacetate no data available



Product Animal Toxicity

Oral LD50 value: LD50 Believed to be approximately 3,000 mg/kg rat

Dermal LD50 value: LD50 Believed to be > 2,000 mg/kg rabbit

Inhalation LC50 no data available

value:

Skin Irritation: May cause mild skin irritation.

Eye Irritation: This material is expected to be moderately irritating.

Skin Sensitization: This material is not known or reported to be a skin or respiratory sensitizer.

Acute Toxicity: Contact with eyes or skin causes irritation.

Subchronic / Chronic Toxicity: Not known or reported to cause subchronic or chronic toxicity.

Reproductive and Developmental Toxicity: No reproductive or developmental risk to humans is expected from exposure to this product.

Mutagenicity: Not known or reported to be mutagenic.

Carcinogenicity: This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA. However, this product contains crystalline silica and cristobalite. Both of these substances are classified by IARC (International Agency for research on Cancer) as group 1 carcinogens (carcinogenic to humans). The carcinogenicity concern arises from inhaling particles of inhalable size. The crystalline silica and cristobalite are carried in a granular clay carrier which has a particle size greater than 10 microns, which is not respirable. Therefore, this product is not an inhalation hazard and exposure would not be expected to pose a carcinogenic hazard., This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA. This product contains a component that has been classified by the U.S. EPA as a "Group D" Carcinogen.

2-butoxyethyl-2,4-dichlorophenoxyacetate This product is classified by the U.S. EPA as a "Group D" Carcinogen.

CRISTOBALITE (SiO2) The International Agency for Research on Cancer (IARC) has classified this product or a component of this product as a Group 1 substance, Carcinogenic to Humans.

QUARTZ (SiO2) The International Agency for Research on Cancer (IARC) has classified this product or a component of this product as a Group 1 substance, Carcinogenic to Humans.



12. ECOLOGICAL INFORMATION

Overview: Moderately toxic to fish and other aquatic organisms., Highly / very toxic to plants.

Ecological Toxicity Values - Product:

- LC50 Believed to be approximately 1.6 mg/l (calculated)

Ecological Toxicity Values for: 2-butoxyethyl-2,4-dichlorophenoxyacetate

- Oncorhynchus mykiss (rainbow trout) - static test 96 h LC50 = 0.452 mg/l
- Lepomis macrochirus (Bluegill sunfish) - static test 96 h LC50 = 0.62 mg/l
- Pimephales promelas (fathead minnow) - static test 96 h LC50 = 2.5 mg/l
- Daphnia magna (Water flea) - static test 48 h EC50= 1.7 mg/l
- Crassostrea virginica (Eastern oyster) - flow-through test 96 h EC50= 3.75 mg/l

13. DISPOSAL CONSIDERATIONS

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THE MATERIAL. THE USER OF THE MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

Waste Disposal Summary : If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D.

Disposal Methods : As a nonhazardous solid waste it should be disposed of in accordance with local, state and federal regulations.



14. TRANSPORT INFORMATION

Land (US DOT): Not Regulated NOT REGULATED AS A DOT HAZARDOUS MATERIAL
 Water (IMDG): NOT REGULATED AS A HAZARDOUS MATERIAL, Marine Pollutant:
 No

Flash Point: Not applicable

Air (IATA): NOT REGULATED AS A HAZARDOUS MATERIAL,
 Emergency Response Guide Number: Not applicable

15. REGULATORY INFORMATION

UNITED STATES:

Toxic Substances Control Act (TSCA): This is an EPA registered pesticide.
 EPA Pesticide Registration Number: None established

FIFRA Listing of Pesticide Chemicals (40 CFR 180): Not registered in the US under FIFRA.

Superfund Amendments and Reauthorization Act (SARA) Title III:

Hazard Categories Sections 311 / 312 (40 CFR 370.2):

Health Immediate (Acute) Health Hazard
 Physical None

Emergency Planning & Community Right to Know (40 CFR 355, App. A):

Extremely Hazardous Substance Section 302 - Threshold Planning Quantity:

ZUS_SAR302 TPQ (threshold planning quantity) None established

Reportable Quantity (49 CFR 172.101, Appendix):

ZUS_CERCLA Reportable quantity None established
 ZUS_SAR302 Reportable quantity None established

Supplier Notification Requirements (40 CFR 372.45), 313 Reportable Components

ZUS_SAR313 De minimis concentration None established

Clean Air Act Toxic ARP Section 112r:

CAA 112R None established



Clean Air Act Socmi:

HON SOC None established

Clean Air Act VOC Section 111:

CAA 111 None established

Clean Air Act Haz. Air Pollutants Section 112:

ZUS_CAAHAP None established

ZUS_CAAHRP None established

CAA AP None established

State Right-to-Know Regulations Status of Ingredients

Pennsylvania:

CAS #	COMPONENT NAME
ZUSPA_RTK	None established

New Jersey:

CAS #	COMPONENT NAME
ZUSNJ_RTK	None established

Massachusetts:

CAS #	COMPONENT NAME
ZUSMA_RTK	None established

California Proposition 65:

CAS #	COMPONENT NAME
ZUSCA_P65	None established

WHMIS Hazard Classification:

None established

16. OTHER INFORMATION

MSDS REVISION STATUS :

SECTIONS REVISED: First formulated version in SAP.

AB NAVIGATE

REVISION DATE : 01/31/2012

Page 12 of 13



Major References : Available upon request.

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THE INFORMATION IN THIS MSDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. ARCH CHEMICALS BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION BUT, MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MSDS IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT ARCH CHEMICALS MSDS CONTROL AT THE PHONE NUMBER ON THE FRONT PAGE TO MAKE CERTAIN THAT THIS DOCUMENT IS CURRENT. .

Navitrol[®] DPF

AQUATIC HERBICIDE

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all, Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for, pesticide regulation.

GENERAL INFORMATION

When applying this product follow all applicable use directions, precautions and limitations.

For Aquatic and Wetland Sites: Use this product for control of emersed, submersed and floating aquatic weeds in the following aquatic sites: ponds; lakes; reservoirs; marshes; wetlands; impounded rivers, streams and other bodies of water that are quiescent; nonirrigation canals, seasonal irrigation waters and ditches which have little or no continuous outflow.

Obtain Required Permits: Consult with appropriate state or local water authorities before applying this product in and around public waters. State or local public agencies may require permits.

Recreational Use of Water in Treatment Area: There are no restrictions on use of water in the treatment area for recreation purposes, including swimming and fishing, after all applications of this product has ceased. For swimming restrictions in treated water in New York State, see "PRECAUTIONS AND RESTRICTIONS".

Livestock Use of Water from Treatment Area: There are no restrictions on livestock consumption of water from the treatment area.

AQUATIC WEEDS CONTROLLED

- alligatorweed
- American lotus
- bladderwort
- Eurasian watermilfoil
- milfoil species
- parrotfeather^{††}
- pickerelweed
- pennywort
- smartweed
- water chestnut^{†, ††}
- yellow water lily (*Nuphar* spp., spatterdock)
- white water lily (*Nymphaea* spp.)
- water primrose (*Ludwigia* spp.)
- watershield (*Brasenia* spp.)

[†]Not for use in California and New York.

^{††}Retreatment may be needed to achieve desired level of control.

APPLICATION METHODS

Surface Applications: Use a mechanical spreader such as a fertilizer spreader or mechanical seeder or similar equipment capable of uniformly applying this product. Before spreading any product, carefully calibrate the application equipment. When using boats and power equipment, you must determine the proper combination of (1) boat speed, (2) rate of delivery from the spreader, and (3) width of swath covered by the product. Use the following formula to calibrate the spreader's delivery in pounds of this product per minute:

$$\text{Miles per hour} \times \text{spreader width (feet)} \times \text{pounds per acre} / 495 = \text{Pounds per minute}$$

Aerial Application (Helicopter Only): Ensure uniform application. All equipment should be properly calibrated using blanks with similar physical characteristics to this product. To avoid streaked, uneven or overlapped application, use an appropriate tracking device (e.g. GPS). Refer to the *Aerial Drift Reduction Advisory* section of this label for additional precautions and instructions for aerial application.

Floating and Emerged Weeds: For control of water lily's (*Nymphaea* spp. and *Nuphar* spp.), watershield (*Brasenia* spp.), and other susceptible emersed and floating herbaceous weeds, apply 1.0 to 2.5 ppm a.e. triclopyr per acre. Apply when plants are actively growing. Use higher rates in the rate range when plants are mature, when the weed mass is dense, or for difficult to control species. Repeat as necessary to control regrowth, but do not exceed a total of 2.5 ppm a.e. triclopyr for the treatment area per annual growing season.

Submersed Weeds - (Excluding New York State - see next section): For control of Eurasian watermilfoil (*Myriophyllum spicatum*) and other susceptible submersed weeds in ponds, lakes, reservoirs, impounded rivers, streams and other bodies of water that are quiescent; non-irrigation canals, and seasonal irrigation waters, or ditches that have little or no continuous outflow, apply this product using mechanical or portable spreading equipment. Rates should be selected according to the rate chart below to provide a triclopyr concentration of 0.50 to 2.5 ppm a.e. in treated water. Use of higher rates in the rate range is recommended in areas of greater water exchange. These areas may require a repeat application. However, total application of this product must not exceed an application rate of 2.5 ppm a.e. triclopyr for the treatment area per annual growing season.

For optimal control, apply when Eurasian watermilfoil or other submersed weeds are actively growing.

CONCENTRATION OF TRICLOPYR ACID IN WATER (PPM a.e.) - Excluding New York State						
Avg. Water Depth (ft)	0.50 ppm	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
	Pounds of Product / acre					
1	14	20	27	41	54	67
2	27	41	54	81	108	135
3	41	61	81	122	162	202
4	54	81	108	162	216	270

For application greater in depth than 4 feet, when targeting difficult to control species and/or sites with high dilution potential, the following formula should be used to calculate application rates should greater than 270 pounds of this product be needed to achieve desired weed control. Note: Do not exceed 2.5 ppm a.e. triclopyr for the treatment area per annual growing season.

$$\text{average depth} \times \text{target ppm} \times 27 = \text{pounds of this product per acre}$$

Example Calculation:

$$6 \text{ foot average depth} \times 2.5 \text{ ppm} \times 27 = 405 \text{ pounds of this product per acre}$$



Aquatic Sites:

For control of emersed, submersed and floating aquatic weeds in the following aquatic sites: ponds; lakes; reservoirs; marshes; wetlands; impounded rivers, streams and other bodies of water that are quiescent; non-irrigation canals, seasonal irrigation waters and ditches which have little or no continuous outflow.

ACTIVE INGREDIENT:

- triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, triethylamine salt.....14.0%
- OTHER INGREDIENTS:**.....86.0%
- TOTAL:**.....100.0%

Acid equivalent: triclopyr – 10.0%

KEEP OUT OF REACH OF CHILDREN
CAUTION / PRECAUCIÓN

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.)

SEE INSIDE FOR FIRST AID AND ADDITIONAL PRECAUTIONARY STATEMENTS

SCAN TO DOWNLOAD PDF ON YOUR MOBILE PHONE

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1-800-558-5106
www.appliedbiochemists.com
EPA REG. NO. 228-597-8959
EPA EST. NO. 008378-IN-001



New York State Specific - Submersed Weeds: For control of Eurasian watermilfoil (*Myriophyllum spicatum*) and other susceptible submersed weeds in ponds, lakes, reservoirs, impounded rivers, streams and other bodies of water that are quiescent; non-irrigation canals, and seasonal irrigation waters, or ditches that have little or no continuous outflow, apply this product using mechanical or portable spreading equipment. Rates should be selected according to the rate chart to the right to provide a triclopyr concentration of 0.50 to 2.5 ppm a.e. in treated water. Use of higher rates in the rate range is recommended in areas of greater water exchange. These areas may require a repeat application. However, total application of this product must not exceed an application rate of 2.5 ppm a.e. Triclopyr for the treatment area per annual growing season.

For optimal control, apply when Eurasian watermilfoil or other submersed weeds are actively growing.

NEW YORK STATE SPECIFIC - CONCENTRATION OF TRICLOPYR ACID IN WATER (PPM a.e.)						
Avg. Water Depth (ft)	0.50 ppm	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
Pounds of Product / acre						
1	14	20	27	41	54	67
2	27	41	54	81	108	135
3	41	61	81	122	162	202
4 feet or greater	54	81	108	162	216	270

Small Site (Less than 1/2 acre) / Spot Treatment Application - (Use Not Acceptable in New York State)

For small treatment sites of 1/2 acre or less use the rate chart below to determine the application rate depending on average water depth to achieve a concentration of 1.25 to 2.5 ppm a.e. Do not exceed 2.5 ppm a.e. triclopyr for the treatment area per annual growing season. Use higher rates in small treatment areas and in areas prone to higher dilution and for heavy weed infestation. Use the lower rates for spot treatment application of areas less prone to dilution and lighter weed infestations. For best results, split the total application rate into three equal applications 8 to 12 hours apart. Apply when water is calm. Example: A 100 ft. by 40 ft. lakeshore swimming area with a 4 ft. average depth, heavily infested with Eurasian watermilfoil.

Step 1: Determine the area to be treated in square feet (ft²) by multiplying the length of the area by the width. 100 ft. x 40 ft. = 4,000 ft².

Step 2: Determine the amount of product to be used by consulting the Product Rate Chart for Areas Less than 1/2 Acre. Use 24.7 lbs. of this product total based on 4 foot average depth in rate chart above.

Step 3: Apply this product uniformly over weeds in treatment site in three equal applications of 8.2 lbs. each, 8 to 12 hours apart.

PRODUCT RATE CHART FOR AREAS LESS THAN 1/2 ACRE - Excluding New York State Pounds of Product				
Area (ft ²)	3 foot average depth		4 foot average depth	
	1.25 ppm a.e.	2.5 ppm a.e.	1.25 ppm a.e.	2.5 ppm a.e.
	500	1.2	2.3	1.5
1000	2.3	4.6	3.1	6.1
4000	9.3	18.6	12.4	24.7
10000	23.2	46.5	31.0	61.9
20000	46.5	93.0	62.0	123.9

For applications with an area or depth not included in the chart above, the following formula should be used to calculate application rates.

$$\text{area (ft}^2\text{)} / 43,560 \times \text{average depth} \times \text{target ppm} \times 27 = \text{pounds of product}$$

Example Calculation: $8250 \text{ ft}^2 / 43,560 \times 4 \text{ foot average depth} \times 1.25 \text{ ppm} \times 27 = 25.6 \text{ pounds of product}$

Small treatment application of this product is recommended with waterproof gloves or a hand spreader to uniformly distribute this product on target weeds.

Precautions for Potable Water Intakes (Excluding New York State - see next section)

For applications of this product to control floating, emersed, and submersed weeds in sites that contain a functioning potable water intake for human consumption, see the chart below to determine the minimum setback distances of the application from the functioning potable water intakes.

CONCENTRATION OF TRICLOPYR ACID IN WATER (PPM a.e.) - Excluding New York					
Area Treated (acres)	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
	Required Setback Distance (ft) from Potable Water Intake				
< 4	300	400	600	800	1000
4 to 8	420	560	840	1120	1400
8 to 16	600	800	1200	1600	2000
16 to 32	780	1040	1560	2080	2600
>32 acres, calculate a setback using the formula for the appropriate rate	Setback(ft) = $(800 * \ln(\text{acres}) - 160) / 3.33$	Setback(ft) = $(800 * \ln(\text{acres}) - 160) / 2.50$	Setback(ft) = $(800 * \ln(\text{acres}) - 160) / 1.67$	Setback(ft) = $(800 * \ln(\text{acres}) - 160) / 1.25$	Setback(ft) = $(800 * \ln(\text{acres}) - 160)$

*Note: ln = natural logarithm

Example Calculation 1: To apply 2.5 ppm of product to 50 acres:

$$\begin{aligned} \text{Setback in feet} &= (800 \times \ln [50 \text{ acres}]) - 160 \\ &= (800 \times 3.912) - 160 \\ &= 2970 \text{ feet} \end{aligned}$$

Example Calculation 2: To apply 0.75 ppm of product to 50 acres:

$$\begin{aligned} \text{Setback in feet} &= (800 \times \ln [50 \text{ acres}]) - 160 / 3.33 \\ &= (800 \times 3.912) - 160 / 3.33 \\ &= 892 \text{ feet} \end{aligned}$$

Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes.

To apply this product around and within the distances noted above from a functioning potable water intake, the intake must be turned off until the triclopyr level in the intake water is determined to be 0.4 parts per million (ppm) or less by laboratory analysis or immunoassay.

New York State Specific - Precautions for Potable Water Intakes:

For applications of this product to control floating, emersed and submersed weeds in sites that contain a functioning potable water intake for human consumption, see the chart to the right to determine the minimum setback distances of the application from the functioning potable water intakes.

New York State Specific Example Calculation 1:

$$\begin{aligned} \text{To apply 2.5 ppm of product to 50 acres:} \\ \text{Setback in feet} &= \sqrt{[(4,102,708 \times 50) + 981,690.7]} \\ &= \sqrt{[206,117,091]} \\ &= 14,357 \text{ feet} \\ &= 14,440 \text{ feet (rounded to the nearest 100 feet)} \end{aligned}$$

New York State Specific Example Calculation 2:

$$\begin{aligned} \text{To apply 0.75 ppm of product to 50 acres:} \\ \text{Setback in feet} &= \sqrt{[(4,102,708 \times 50) + 981,690.7]} / 3.33 \\ &= \sqrt{[206,117,091]} / 3.33 \\ &= 4,311 \text{ feet} \\ &= 4,300 \text{ feet (rounded to the nearest 100 feet)} \end{aligned}$$

Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes. These setback restrictions do not apply to terrestrial applications made adjacent to potable water intakes.

To apply this product around and within the distances noted above from a functioning potable water intake, the intake

must be turned off until the triclopyr level in the intake water is determined to be 50 parts per billion (ppb) or less by laboratory analysis or immunoassay.

Recreational Use of Water in Treatment Area: DO NOT swim in water treated with this product for three (3) hours after treatment. There are no restrictions on use of water in the treatment area for fishing.

Livestock Use of Water from Treatment Area: There are no restrictions on livestock consumption of water from the treatment area.

Wetland Sites: Wetlands include flood plains, deltas, marshes, swamps, bogs and transitional areas between upland and lowland sites.

Wetlands may occur within forests, wildlife habitat restoration and management areas and similar sites as well as areas adjacent to or surrounding domestic water supply reservoirs, lakes and ponds.

For control of emersed, floating or submersed aquatic weeds in wetland sites, follow use directions and application methods associated with the *Floating and Emersed* or *Submersed* sections on this label.

Use Precautions: Minimize unintentional application to open water when treating target vegetation in wetland sites. **Note:** Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat such areas.

NEW YORK SPECIFIC - CONCENTRATION OF TRICLOPYR ACID IN WATER (PPM a.e.)					
Area Treated (acres)	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
	Required Setback Distance (ft) from Potable Water Intake				
< 4	1300	400	600	800	1000
4 to 8	1700	560	840	1120	1400
8 to 16	2400	800	1200	1600	2000
16 to 32	3500	1040	1560	2080	2600
>32 acres, calculate a setback using the formula for the appropriate rate	Setback (ft) = $\sqrt{[(4,102,708 \times \text{acres treated}) + 981,690.7]} / 3.33$	Setback (ft) = $\sqrt{[(4,102,708 \times \text{acres treated}) + 981,690.7]} / 2.50$	Setback (ft) = $\sqrt{[(4,102,708 \times \text{acres treated}) + 981,690.7]} / 1.67$	Setback (ft) = $\sqrt{[(4,102,708 \times \text{acres treated}) + 981,690.7]} / 1.25$	Setback (ft) = $\sqrt{[(4,102,708 \times \text{acres treated}) + 981,690.7]}$

Note: † = Square Root

PRECAUTIONS AND RESTRICTIONS

- **New York State specific restriction:** Note to all pesticide applicators: Before application under any project program, notification of an approval by the NYS Department of Environmental Conservation is required, either by an aquatic permit issued pursuant to ECL Section 15.0313(4) or issuance of purchase permits for such use.
- **New York State specific restriction:** DO NOT swim in water treated with this product for three (3) hours after treatment. There are no restrictions on use of water in the treatment area for fishing.
- **Chemigation:** DO NOT apply this product through any type of irrigation system.
- **Irrigation:** Water treated with this product may not be used for irrigation purposes for 120 days after application or until triclopyr residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less. This label describes both required and recommended uses of a chemical analysis for the active ingredients triclopyr. Applied Biochemists recommends the use of an Enzyme-Linked Immunoassay (ELISA) test for the determination of the active ingredient concentration in water. Contact Applied Biochemists for the incorporation of this analysis in your treatment program. Other proven chemical analysis for the active ingredient may also be used. The ELISA analysis is referenced in this label as the preferred method for the rapid determination of the concentration of the active ingredient in the water.
- **Seasonal Irrigation Waters:** This product may be applied during the off season to surface waters that are used for irrigation on a seasonal basis, provided that there is a minimum of 120 days between product application and the first use of treated water for irrigation purposes or until triclopyr residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.
- **Irrigation Canals/Ditches:** DO NOT apply this product to irrigation canals/ditches unless the 120 day restriction on irrigation water usage can be observed or triclopyr residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.
- **There is no restriction on use of treated water to irrigate established grasses.**
- DO NOT apply this product directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers, or other desirable broadleaf plants, and do not permit product dust to drift into them.
- DO NOT apply to salt water bays or estuaries.
- DO NOT apply directly to un-impounded rivers or streams.
- DO NOT apply on ditches or canals currently being used to transport irrigation water or that will be used for irrigation within 120 days following treatment or until triclopyr residue levels are determined to be 1.0 ppb or less.
- DO NOT apply where runoff water may flow onto agricultural land as injury to crops may result.
- **Grazing and Haying Restrictions:** Except for lactating dairy animals, there are no grazing restrictions following application of this product.
 - **Grazing Lactating Dairy Animals:** DO NOT allow lactating dairy animals to graze treated areas until the next growing season following application of this product.
 - DO NOT harvest hay for 14 days after application.
 - Grazed areas of non-cropland and forestry sites may be spot treated if they comprise no more than 10% of the total grazable area.
- **Slaughter Restrictions:** During the season of application, withdraw livestock from grazing treated grass at least 3 days before slaughter.

BEST PRACTICES FOR DRIFT MANAGEMENT

Equipment used in the application of this product should be carefully calibrated before use and checked frequently during application to be sure it is working properly and delivering a uniform distribution pattern to prevent dosage of this product above specified limits, do not overlap applications. Aerial application should be made only when the wind velocity is 2 to 10 mph.

Applications should be made only when there is little or no hazard for volatility or dust drift, and when application can maintain this product's placement in the intended area. Very small quantities of dust, which may not be visible, may seriously injure susceptible plants, and this product may be blown outside of the intended treatment area under extreme conditions. Do not spread this product when wind is blowing toward susceptible crops or ornamental plants that are near enough to be injured.

Avoiding drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather related factors determine the potential for drift. The applicator is responsible for considering all these factors when making decisions.

Ground Application Equipment: To aid in reducing drift, this product should be applied when wind velocity is low (follow state regulations; see *Sensitive Area* under *Aerial Drift Reduction Advisory* below) or using a slurry injection system.

Aerial Drift Reduction Advisory

This section is advisory in nature and does not supersede the mandatory label requirements.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces drift potential. **Swath Adjustment:** When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (e.g. higher wind). **Wind:** Drift potential is lowest between wind speeds of 2 to 10 mph (follow state regulations). However, many factors, including equipment type, determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. **Note:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect drift. **Sensitive Areas:** This product should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

IF ANY CONTENT ON THIS LABEL IS NOT UNDERSTOOD, OR YOU NEED FURTHER ASSISTANCE, CONTACT AN APPLIED BIOCHEMISTS SPECIALIST WITH QUESTIONS SPECIFIC TO YOUR APPLICATION.

For Chemical Spill, Leak, Fire, or Exposure, Call CHEMTREC (800) 424-9300
CLASSIFIED FOR "RESTRICTED USE" IN NEW YORK STATE UNDER 6NYCRR PART 326.

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS CAUTION - PRECAUCIÓN

Causes moderate eye irritation. Avoid contact with eyes or clothing.

PERSONAL PROTECTIVE EQUIPMENT (PPE):

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes and/or waterproof boots plus socks
- Waterproof gloves

FIRST AID

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 OR CLOTHING

- 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 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.

HOT LINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

If a medical emergency arises contact Arch Chemicals Emergency Action Network in the US call 1-800-654-6911 or outside the US call 423-780-2970. For help with a spill, leak, fire or exposure involving this material call CHEMTREC 1-800-424-9300.

USER SAFETY RECOMMENDATIONS

Users Should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. If pesticide gets on skin, wash immediately with soap and water.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

Under certain conditions, treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants, which may cause fish suffocation. Therefore, to minimize this hazard **DO NOT** treat more than one-half (1/2) of the water area in a single operation and wait at least 10 days between treatments when susceptible plants are mature and have grown to the water's surface, or when the treatment would result in significant reductions in total plant biomass. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Consult with the State agency for fish and game before applying to public water to determine if a permit is needed.

AGRICULTURAL CHEMICAL: Do not ship or store with food, feeds, drugs or clothing.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.

PESTICIDE STORAGE: Store in original container. Do not store near food or feed. In case of leak or spill, contain material and dispose as waste.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Plastic Bags: Nonrefillable container. Do not reuse or refill this container. Completely empty bag into application equipment by shaking and tapping sides and bottom to loosen clinging particles. If not emptied in this manner, the bag may be considered an acute hazardous waste and must be disposed in accordance with local, state and federal regulations. When completely empty, offer for recycling if available or dispose of bag in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

WARRANTY DISCLAIMER

The directions for use of this product must be followed carefully. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, (1) THE GOODS DELIVERED TO YOU ARE FURNISHED "AS IS" BY MANUFACTURER OR SELLER AND (2) MANUFACTURER AND SELLER MAKE NO WARRANTIES, GUARANTEES, OR REPRESENTATIONS OF ANY KIND TO BUYER OR USER, EITHER EXPRESS OR IMPLIED, OR BY USAGE OF TRADE, STATUTORY OR OTHERWISE, WITH REGARD TO THE PRODUCT SOLD, INCLUDING, BUT NOT LIMITED TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, USE, OR ELIGIBILITY OF THE PRODUCT FOR ANY PARTICULAR TRADE USAGE. UNINTENDED CONSEQUENCES, INCLUDING BUT NOT LIMITED TO INEFFECTIVENESS, MAY RESULT BECAUSE OF SUCH FACTORS AS THE PRESENCE OR ABSENCE OF OTHER MATERIALS USED IN COMBINATION WITH THE GOODS, OR THE MANNER OF USE OR APPLICATION, INCLUDING WEATHER, ALL OF WHICH ARE BEYOND THE CONTROL OF MANUFACTURER OR SELLER AND ASSUMED BY BUYER OR USER. THIS WRITING CONTAINS ALL OF THE REPRESENTATIONS AND AGREEMENTS BETWEEN BUYER, MANUFACTURER AND SELLER, AND NO PERSON OR AGENT OF MANUFACTURER OR SELLER HAS ANY AUTHORITY TO MAKE ANY REPRESENTATION OR WARRANTY OR AGREEMENT RELATING IN ANY WAY TO THESE GOODS.

LIMITATION OF LIABILITY

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, MANUFACTURER OR SELLER SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR FOR DAMAGES IN THEIR NATURE OF PENALTIES RELATING TO THE GOODS SOLD, INCLUDING USE, APPLICATION, HANDLING, AND DISPOSAL. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, MANUFACTURER OR SELLER SHALL NOT BE LIABLE TO BUYER OR USER BY WAY OF INDEMNIFICATION TO BUYER OR TO CUSTOMERS OF BUYER, IF ANY, OR FOR ANY DAMAGES OR SUMS OF MONEY, CLAIMS OR DEMANDS WHATSOEVER, RESULTING FROM OR BY REASON OF, OR ARISING OUT OF THE MISUSE, OR FAILURE TO FOLLOW LABEL WARNINGS OR INSTRUCTIONS FOR USE, OF THE GOODS SOLD BY MANUFACTURER OR SELLER TO BUYER. ALL SUCH RISKS SHALL BE ASSUMED BY THE BUYER, USER, OR ITS CUSTOMERS. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BUYER'S OR USER'S EXCLUSIVE REMEDY, AND MANUFACTURER'S OR SELLER'S TOTAL LIABILITY SHALL BE FOR DAMAGES NOT EXCEEDING THE COST OF THE PRODUCT.

If you do not agree with or do not accept any of the directions for use, the warranty disclaimers, or limitations on liability, do not use the product, and return it unopened to the Seller, and the purchase price will be refunded.

(RV032410N)

110712

NAVITROL is a registered trademark of Applied Biochemists



FOR ANY EMERGENCY, 24 HOURS / 7 DAYS, CALL:	1-800-654-6911 (OUTSIDE USA: 1-423-780-2970)
FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC®:	1-800-424-9300 (OUTSIDE USA: 1-703-527-3887)
FOR ALL MSDS QUESTIONS & REQUESTS, CALL:	1-800-511-MSDS (OUTSIDE USA: 1-423-780-2347)

PRODUCT NAME: AB NAVITROL DPF AQUATIC HERBICIDE

1. PRODUCT AND COMPANY IDENTIFICATION

Supplier
Applied Biochemists (WI)
W175 N11163 Stonewood Drive ,
Suite 234
Germantown, WI, 53022
United States

Telephone: +12622554449
Telefax: +12622554268
Web: www.appliedbiochemists.com

REVISION DATE: 12/07/2011
SUPERCEDES: 03/09/2009

MSDS Number: 000000012767
SYNONYMS:
CHEMICAL FAMILY: None
DESCRIPTION / USE: None established
FORMULA: None established

Manufacturer
Advantis Technologies
1400 Bluegrass Lakes Parkway
Alpharetta, GA 30004
United States of America

2. HAZARDS IDENTIFICATION

OSHA Hazard Classification:	Moderate eye irritant
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Routes of Entry:	Skin Eyes Ingestion
Chemical Interactions:	No known interactions
Medical Conditions Aggravated:	No data available



Human Threshold Response Data

Odor Threshold Not established for product.
Irritation Threshold Not established for product.

Hazardous Materials Identification System / National Fire Protection Association Classifications

<u>Hazard Ratings :</u>	<u>Health</u>	<u>Flammability</u>	<u>Physical / Instability</u>	<u>PPI / Special hazard.</u>
HMIS	2	0	0	
NFPA	2	0	0	

Immediate (Acute) Health Effects

Inhalation Toxicity: Not expected to be irritating. Not expected to be toxic by inhalation.
Skin Toxicity: Not expected to be irritating to the skin. Not expected to be toxic from dermal contact.
Eye Toxicity: Contact may cause moderate irritation consisting of transient redness, swelling, and mucous membrane discharge to the conjunctiva. No corneal involvement or visual impairment is expected.
Ingestion Toxicity: Ingestion may cause irritation of the gastrointestinal tract and gastrointestinal discomfort with any or all of the following symptoms: nausea, vomiting or diarrhea. Not expected to be toxic by ingestion.
Acute Target Organ Toxicity: May cause eye irritation., Ingestion may cause mild gastrointestinal discomfort.

Prolonged (Chronic) Health Effects

Carcinogenicity: This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA. However, this product contains crystalline silica and cristobalite. Both of these substances are classified by IARC (International Agency for research on Cancer) as group 1 carcinogens (carcinogenic to humans). The carcinogenicity concern arises from inhaling particles of inhalable size. The crystalline silica and cristobalite are carried in a granular clay carrier which has a particle size greater than 10 microns, which is not respirable. Therefore, this product is not an inhalation hazard and exposure would not be expected to pose a carcinogenic hazard.
Reproductive and Developmental Toxicity: No reproductive or developmental risk to humans is expected from exposure to this product. The active ingredient in this product has been tested in laboratory animals and no evidence of teratogenicity or fetotoxicity was seen.
Inhalation: There are no known or reported effects from chronic exposure.



Skin Contact: There are no known or reported effects from chronic exposure.
 Ingestion: There are no known or reported effects from chronic ingestion except for effects similar to those experienced from single exposure.
 Sensitization: This material is not known or reported to be a skin or respiratory sensitizer. A similar product was found to be a negative skin sensitizer in the Guinea pig Buehler method test.
 Chronic Target Organ Toxicity: There are no known or reported effects to humans from repeated exposure to this product.
 Supplemental Health Hazard Information : No additional health information available.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>CAS OR CHEMICAL NAME</u>	<u>CAS #</u>		<u>% RANGE</u>
triclopyr, triethylamine salt	57213-69-1	>=	
Bentonite	1302-78-9	>=	39.6 - 66
crystalline silica, tridymite	15468-32-3	>=	0 - 0.66
CRISTOBALITE (SiO ₂)	14464-46-1	>=	0 - 0.66
QUARTZ (SiO ₂)	14808-60-7	>=	0.66 - 3.3
EDTA	60-00-4	>=	- 2
Citric Acid	77-92-9	>=	



4. FIRST AID MEASURES

General Advice:	Call a poison control center or doctor for treatment advice. For 24-hour emergency medical assistance, call Arch Chemical Emergency Action Network at 1-800-654-6911. Have the product container or label with you when calling a poison control center or doctor, or going for treatment.
Inhalation:	IF INHALED: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.
Skin Contact:	IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
Eye Contact:	IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 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.
Ingestion:	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 a poison control center or doctor. Do not give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flammability Summary (OSHA):	The product is not flammable., Not combustible., The substance or mixture is not classified as pyrophoric., Not explosive
<u>Flammable Properties</u>	
Fire / Explosion Hazards:	Will not burn
Extinguishing Media:	Water spray Foam Dry chemical Carbon dioxide
Fire Fighting Instructions:	In case of fire, use normal fire-fighting equipment and the personal protective equipment recommended in Section 8 to include a NIOSH approved self-contained breathing apparatus. Use water to cool containers.
Hazardous Combustion Products:	During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

6. ACCIDENTAL RELEASE MEASURES

Personal Protection for Emergency Situations:	Use the personal protective equipment recommended in Section 8 and a NIOSH approved self-contained breathing apparatus.
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Spill Mitigation Procedures

Air Release: Keep people away from and upwind of spill/leak.
 Water Release: If the product contaminates rivers and lakes or drains inform respective authorities.
 Land Release: Avoid dust generation. Sweep up and shovel into suitable containers for disposal. The product should not be allowed to enter drains, water courses or the soil.
 Additional Spill Information : Prevent further leakage or spillage if safe to do so. Evacuate personnel to safe areas. Use personal protective equipment as required. Remove all sources of ignition.

7. HANDLING AND STORAGE

Handling: Do not take internally. Avoid contact with skin, eyes and clothing. Upon contact with skin or eyes, wash off with water. Avoid inhalation of dust and fumes.
 Storage: Store in a cool, dry and well ventilated place. Isolate from incompatible materials.
 Incompatible Materials for Storage: Refer to Section 10, "Incompatible Materials."

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation: Local exhaust ventilation or other engineering controls are normally required when handling or using this product to keep airborne exposures below the TLV, PEL or other recommended exposure limit.

Protective Equipment for Routine Use of Product

Respiratory Protection : Wear a NIOSH approved respirator if levels above the exposure limits are possible., Wear a NIOSH approved N95 respirator.
 Skin Protection : Wear impervious gloves to avoid skin contact.
 Eye Protection: Use chemical goggles.
 Protective Clothing Type: impervious clothing
 General Protective Measures: Emergency eyewash should be provided in the immediate work area.

Exposure Limit Data

CHEMICAL NAME	CAS #	Name of Limit	Exposure
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crystalline silica, tridymite	15468-32-3	OSHA Z3	250 million particles per cubic foot TWA respirable Use ½ the value calculated from the count or mass formulae for quartz., The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable., division by %SiO2+5
crystalline silica, tridymite	15468-32-3	OSHA Z1	
CRISTOBALITE (SiO2)	14464-46-1	OSHA Z3	
CRISTOBALITE (SiO2)	14464-46-1	OSHA Z3	10 mg/m3 TWA respirable Use ½ the value calculated from the count or mass formulae for quartz., Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics: Aerodynamic diameter (unit density sphere): 2; Percent passing selector: 90 Aerodynamic diameter (unit density sphere): 2,5; Percent passing selector: 75 Aerodynamic diameter (unit density sphere): 3,5; Percent passing selector: 50 Aerodynamic diameter (unit density sphere): 5,0; Percent passing selector: 25 Aerodynamic diameter (unit density sphere): 10; Percent passing selector: 0 The measurements under this note refer to the use of an AEC (now NRC) instrument. The respirable fraction of coal dust is determined with an MRE; the figure corresponding to that of 2.4 mg/m3 in the table for coal dust is 4.5 mg/m3., division by %SiO2+2



CRISTOBALITE (SiO ₂)	14464-46-1	OSHA Z3	30 mg/m ³ TWA Total dust Use ½ the value calculated from the count or mass formulae for quartz., division by %SiO ₂ +2
CRISTOBALITE (SiO ₂)	14464-46-1	ACGIH	0.025 mg/m ³ TWA respirable dust fraction Respirable fraction; see Appendix C, paragraph C.
CRISTOBALITE (SiO ₂)	14464-46-1	ACGIH	0.025 mg/m ³ TWA Respirable fraction
CRISTOBALITE (SiO ₂)	14464-46-1	OSHA Z3	
CRISTOBALITE (SiO ₂)	14464-46-1	OSHA Z1	
QUARTZ (SiO ₂)	14808-60-7	OSHA Z3	8-hour time weighted average
QUARTZ (SiO ₂)	14808-60-7	OSHA Z3	8-hour time weighted average
QUARTZ (SiO ₂)	14808-60-7	OSHA Z3	8-hour time weighted average
QUARTZ (SiO ₂)	14808-60-7	ACGIH	0.025 mg/m ³ TWA respirable dust fraction Respirable fraction; see Appendix C, paragraph C.
QUARTZ (SiO ₂)	14808-60-7	ACGIH	0.025 mg/m ³ TWA Respirable fraction
QUARTZ (SiO ₂)	14808-60-7	OSHA Z1	
QUARTZ (SiO ₂)	14808-60-7	NIOSH-IDLH	25 mg/m ³
QUARTZ (SiO ₂)	14808-60-7	NIOSH-IDLH	50 mg/m ³

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	solid
Form	No data.
Color:	No data.
Odor:	No data.
Molecular Weight:	None established
Specific Gravity :	no data available
pH :	6.0 - 7.0
Boiling Point:	not applicable
Freezing Point:	no data available



Melting Point:	no data available
Density:	not applicable
Bulk Density:	9.2610 kg/m ³
Vapor Pressure:	no data available
Vapor Density:	not applicable
Viscosity:	not applicable
Solubility in Water:	insoluble
Partition coefficient n-octanol/water:	Not applicable
Evaporation Rate:	no data available
Oxidizing:	None established
Volatiles, % by vol.:	no data available
VOC Content	no data available
HAP Content	Not applicable

10. STABILITY AND REACTIVITY

Stability and Reactivity Summary:	Stable under normal conditions.
Conditions to Avoid:	Heat, flames and sparks.
Chemical Incompatibility:	Strong oxidizing agents, Strong acids and strong bases
Hazardous Decomposition Products:	Hydrogen chloride, Oxides of nitrogen, Phosgene
Decomposition Temperature:	No data

11. TOXICOLOGICAL INFORMATION

Component Animal Toxicology

Oral LD50 value:

triclopyr, triethylamine salt	LD50	= 1,847 mg/kg	rat
EDTA	LD50	> 2,000 mg/kg	rat
Citric Acid	LD50	= 3,000 mg/kg	rat

Component Animal Toxicology

Dermal LD50 value:

triclopyr, triethylamine salt	LD50	> 2,000 mg/kg	rabbit
EDTA		no data available	
Citric Acid	LD50	Believed to be > 2,000 mg/kg	rabbit



Component Animal Toxicology

Inhalation LC50 value:

triclopyr, triethylamine salt	LC50 4 h > 2.6 MG/L	rat
Bentonite	Respiratory irritant	
EDTA	no data available	
Citric Acid	no data available	

Product Animal Toxicity

Oral LD50 value: LD50 Believed to be > 5,000 mg/kg rat

Dermal LD50 value: LD50 Believed to be > 5,000 mg/kg rat

Inhalation LC50 value: LC50 4 h Believed to be > 2.0 mg/l rat

Skin Irritation: Not expected to be irritating to the skin.

Eye Irritation: This material is expected to be moderately irritating.

Skin Sensitization: This material is not known or reported to be a skin or respiratory sensitizer., A similar product was found to be a negative skin sensitizer in the Guinea pig Buehler method test.

Acute Toxicity: May cause eye irritation. Ingestion may cause mild gastrointestinal discomfort.

Subchronic / Chronic Toxicity: Not known or reported to cause subchronic or chronic toxicity.

Reproductive and Developmental Toxicity: No reproductive or developmental risk to humans is expected from exposure to this product. The active ingredient in this product has been tested in laboratory animals and no evidence of teratogenicity or fetotoxicity was seen.

triclopyr, triethylamine salt	This chemical has been tested in laboratory animals and no evidence of teratogenicity, embryotoxicity or fetotoxicity was seen.
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Citric Acid	This chemical has been tested in laboratory animals and there was no evidence of reproductive toxicity or teratogenicity.
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Mutagenicity: Not known or reported to be mutagenic. The active ingredient in this product has been tested in a battery of mutagenicity assays and was found to be non-mutagenic under the conditions of the tests.

triclopyr, triethylamine salt	This material has been shown to be non-mutagenic in the majority of a battery of assays. Not expected to be a mutagenic hazard.
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Citric Acid	This product was determined to be non-mutagenic in the Ames assay. It was also shown to be negative in the Dominant lethal assay.
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Carcinogenicity: This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA. However, this product contains crystalline silica and cristobalite. Both of these substances are classified by IARC (International Agency for research on Cancer) as group 1 carcinogens (carcinogenic to humans). The carcinogenicity concern arises from inhaling particles of inhalable size. The crystalline silica and cristobalite are carried in a granular clay carrier which has a particle size greater than 10 microns, which is not respirable. Therefore, this product is not an inhalation hazard and exposure would not be expected to pose a carcinogenic hazard., This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP or EPA. This product contains a component that has been classified by the U.S. EPA as a "Group D" Carcinogen.

triclopyr, triethylamine salt	The carcinogenicity has been evaluated through animal study and it was found not to be carcinogenic., This product is classified by the U.S. EPA as a "Group D" Carcinogen.
CRISTOBALITE (SiO2)	The International Agency for Research on Cancer (IARC) has classified this product or a component of this product as a Group 1 substance, Carcinogenic to Humans.
QUARTZ (SiO2)	The International Agency for Research on Cancer (IARC) has classified this product or a component of this product as a Group 1 substance, Carcinogenic to Humans.
Citric Acid	The carcinogenicity has been evaluated through animal study and it was found not to be carcinogenic.

12. ECOLOGICAL INFORMATION

Overview: Practically non- toxic to fish and other aquatic organisms., Highly / very toxic to plants.

Ecological Toxicity Values for: **triclopyr, triethylamine salt**

Oncorhynchus mykiss (rainbow trout)	- flow-through test 96 h LC50 = 240 mg/l
Lepomis macrochirus (Bluegill sunfish)	- flow-through test 96 h LC50 = 471 mg/l
Pimephales promelas (fathead minnow)	- flow-through test 96 h LC50 = 120 mg/l
Coho salmon	- static test 96 h LC50 = 463 mg/l
Daphnia magna (Water flea)	- Immobilization 48 h EC50= 1,496 mg/l
Daphnia magna (Water flea)	- static test 48 h LC50= 1,170 mg/l
Colinus virginianus (Bobwhite quail)	- 8 day dietary LC50 > 10,000 ppm



Anas platyrhynchos (Mallard duck) - 8 day dietary LC50 > 10,000 ppm
Anas platyrhynchos (Mallard duck) - Oral LD50 = 2,055 mg/kg

Ecological Toxicity Values for: Citric Acid

Lepomis macrochirus (Bluegill sunfish) - (static). 96 h LC50 = 1,516 mg/l
Daphnia magna (Water flea) - 72 h EC50 Approximately 120 mg/l

13. DISPOSAL CONSIDERATIONS

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THE MATERIAL. THE USER OF THE MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

Waste Disposal Summary : If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D.

Disposal Methods : As a nonhazardous solid waste it should be disposed of in accordance with local, state and federal regulations.

14. TRANSPORT INFORMATION

Land (US DOT): Not Regulated NOT REGULATED AS A DOT HAZARDOUS MATERIAL
Water (IMDG): NOT REGULATED AS A HAZARDOUS MATERIAL,

Air (IATA): NOT REGULATED AS A HAZARDOUS MATERIAL,
Emergency Response Guide Number: Not applicable



15. REGULATORY INFORMATION

UNITED STATES:

Toxic Substances Control Act (TSCA): This product is regulated under the Federal Insecticide, Fungicide and Rodenticide Act. It must be used for purposes consistent with its labeling.

EPA Pesticide Registration Number: None established

FIFRA Listing of Pesticide Chemicals (40 CFR 180): This product is regulated under the Federal Insecticide, Fungicide and Rodenticide Act. It must be used for purposes consistent with its labeling.

Superfund Amendments and Reauthorization Act (SARA) Title III:

Hazard Categories Sections 311 / 312 (40 CFR 370.2):

Health	Immediate (Acute) Health Hazard
Physical	None

Emergency Planning & Community Right to Know (40 CFR 355, App. A):

Extremely Hazardous Substance Section 302 - Threshold Planning Quantity:

ZUS_SAR302	TPQ (threshold planning quantity)	None established
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Reportable Quantity (49 CFR 172.101, Appendix):

ZUS_CERCLA	Reportable quantity	None established
ZUS_SAR302	Reportable quantity	None established

Supplier Notification Requirements (40 CFR 372.45), 313 Reportable Components

ZUS_SAR313	De minimis concentration	None established
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Clean Air Act Toxic ARP Section 112r:

CAA 112R	None established
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Clean Air Act Socmi:

HON SOC	None established
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Clean Air Act VOC Section 111:

CAA 111	None established
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Clean Air Act Haz. Air Pollutants Section 112:

ZUS_CAAHAP	None established
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ZUS_CAAHRP None established

CAA AP None established

State Right-to-Know Regulations Status of Ingredients

Pennsylvania:

CAS #	COMPONENT NAME
ZUSPA_RTK	None established

New Jersey:

CAS #	COMPONENT NAME
ZUSNJ_RTK	None established

Massachusetts:

CAS #	COMPONENT NAME
ZUSMA_RTK	None established

California Proposition 65:

CAS #	COMPONENT NAME
ZUSCA_P65	None established

WHMIS Hazard Classification:

None established

16. OTHER INFORMATION

MSDS REVISION STATUS :

SECTIONS REVISED:

Major References :

First formulated version in SAP.

Available upon request.



THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THE INFORMATION IN THIS MSDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. ARCH CHEMICALS BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION BUT, MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MSDS IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT ARCH CHEMICALS MSDS CONTROL AT THE PHONE NUMBER ON THE FRONT PAGE TO MAKE CERTAIN THAT THIS DOCUMENT IS CURRENT. .

Renovate® 3

Specialty Herbicide

SPECIMEN



Aquatic Sites: For control of emersed, submersed and floating aquatic plants in aquatic sites such as ponds, lakes, reservoirs, non-irrigation canals, seasonal irrigation waters and ditches which have little or no continuous outflow, marshes and wetlands, including broadleaf and woody vegetation on banks and shores within or adjacent to these and other aquatic sites.

For use in New York State, comply with Section 24(c) Special Local Need labeling for Renovate® 3, SLN NY-060001

Active Ingredient

triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid,
triethylamine salt44.4%

Other Ingredients55.6%

TOTAL100.0%

Acid equivalent: triclopyr - 31.8% - 3 lb/gal

Keep Out of Reach of Children

DANGER / PELIGRO

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.)

NOTICE: Read the entire label. Use only according to label directions. Before using this product, read *Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies* at end of label booklet. If terms are unacceptable, return at once unopened.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Renovate is a registered trademark of Dow AgroSciences LLC.

Produced for: **SePRO Corporation**
11550 North Meridian Street
Suite 600, Carmel, IN 46032, U.S.A.

EPA Reg. 62719-37-67690
FPL20120201

PRECAUTIONARY STATEMENTS

Hazard to Humans and Domestic Animals

DANGER

Corrosive. Causes Irreversible Eye Damage. Harmful If Swallowed Or Absorbed Through Skin. Prolonged Or Frequently Repeated Skin Contact May Cause Allergic Reaction In Some Individuals. Do not get in eyes or on skin or clothing.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants;
- Shoes plus socks;
- Protective eyewear; and
- Chemical resistant gloves (≥ 14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber.

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 exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

ENGINEERING CONTROLS

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

USER SAFETY RECOMMENDATIONS

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.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

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First Aid	
If in eyes:	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15 - 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 or clothing:	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 - 20 minutes. • Call a poison control center or doctor for treatment advice.
If swallowed:	<ul style="list-style-type: none"> • 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 a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
<p>Have the product container or label with you when calling a poison control center or doctor, or going for treatment. In case of emergency endangering health or the environment involving this product, call INFOTRAC at 1-800-535-5053.</p>	
<p>Note to Applicator: Allergic skin reaction is not expected from exposure to spray mixtures of Renovate 3 herbicide when used as directed.</p>	
<p>Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.</p>	

ENVIRONMENTAL HAZARDS

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Under certain conditions, treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants, which may contribute to fish suffocation. This loss can cause fish suffocation. Therefore, to minimize this hazard, do not treat more than one-third to one-half of the water area in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Consult with the State agency for fish and game before applying to public water to determine if a permit is needed.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

PHYSICAL OR CHEMICAL HAZARDS

Combustible. Do not use or store the product near heat or open flame.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all *Directions for Use* carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls;
- Shoes plus socks;
- Protective eyewear; and
- Chemical-resistant gloves (≥ 14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber.

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for Agricultural Pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Entry Restrictions for Non-WPS Uses: For applications to non-cropland areas, do not allow entry into areas until sprays have dried, unless applicator and other handler PPE is worn.

GENERAL INFORMATION FOR AQUATIC AND WETLAND SITES

Use Renovate 3 herbicide for control of emerged, submersed and floating aquatic plants in aquatic sites such as ponds, lakes, reservoirs, non-irrigation canals, and ditches which have little or no continuous outflow, marshes and wetlands, including broadleaf and woody vegetation on banks and shores within or adjacent to these and other aquatic sites.

Obtain Required Permits: Consult with appropriate state or local water authorities before applying this product to public waters. State or local public agencies may require permits.

GENERAL USE PRECAUTIONS AND RESTRICTIONS

For use in New York State, comply with Section 24(c) Special Local Need labeling for Renovate® 3, SLN NY-060001.

When applying this product in tank mix combination, follow all applicable use directions, precautions and limitations on each manufacturer's label.

Chemigation: Do not apply this product through any type of irrigation system.

Irrigation: Do not use treated water for irrigation for 120 days following application. As an alternative to waiting 120 days, treated water may be used for irrigation once the triclopyr level in the intake water is determined to be non-detectable by laboratory analysis (immunoassay). There is no restriction on use of water from the treatment area to irrigate established grasses.

Water treated with Renovate 3 may not be used for irrigation purposes for 120 days after application or until residue levels of Renovate 3 are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

Seasonal Irrigation Waters: Renovate 3 may be applied during the off-season to surface waters that are used for irrigation on a seasonal basis provided that there is a minimum of 120 days between applying Renovate 3 and the first use of treated water for irrigation purposes, or until residue levels of Renovate 3 are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

Irrigation Canals/Ditches: Do not apply Renovate 3 to irrigation canals/ditches unless the 120-day restriction on irrigation water usage can be observed or residue levels of Renovate 3 are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

Do not apply Renovate 3 directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers, or other desirable broadleaf plants, and do not permit spray mists containing it to drift into them.

- **Do not** apply to salt water bays or estuaries.
- **Do not** apply directly to un-impounded rivers or streams.
- **Do not** apply on ditches or canals currently being used to transport irrigation water or that will be used for irrigation within 4 months following treatment. It is permissible to treat irrigation and non-irrigation ditch banks.
- **Do not** apply where runoff water may flow onto agricultural land as injury to crops may result.
- When making applications to control unwanted plants on banks or shorelines of moving water sites, minimize overspray to open water.
- The use of a mist blower is not recommended.

Grazing and Haying Restrictions

Except for lactating dairy animals, there are no grazing restrictions following application of this product.

- **Grazing Lactating Dairy Animals:** Do not allow lactating dairy animals to graze treated areas until the next growing season following application of this product.
- Do not harvest hay for 14 days after application.
- Grazed areas of non-cropland and forestry sites may be spot treated if they comprise no more than 10% of the total grazable area.

Slaughter Restrictions: During the season of application, withdraw livestock from grazing treated grass at least 3 days before slaughter.

Avoiding Injurious Spray Drift

Applications should be made only when there is little or no hazard from spray drift. Very small quantities of spray, which may not be visible, may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible crops or ornamental plants near enough to be injured. It is suggested that a continuous smoke column at or near the spray site or a smoke generator on the spray equipment be used to detect air movement, lapse conditions, or temperature inversions (stable air). If the smoke layers or indicates a potential of hazardous spray drift, do not spray.

Aerial Application: For aerial application near susceptible crops, apply through a Microfoil† or Thru-Valve boom†, or use a drift control additive labeled for aquatic use. Other drift reducing systems or thickened sprays prepared by using high viscosity inverting systems may be used if they are made as drift-free mixtures containing thickening agents labeled for use in aquatics or applications made with the Microfoil or Thru-Valve boom. Keep spray pressures low enough to provide coarse spray droplets. Spray boom should be no longer than 3/4 of the rotor length. Do not use a thickening

agent with the Microfoil or Thru-Valve booms, or other systems that cannot accommodate thick sprays. Spray only when the wind velocity is low (follow state regulations). Avoid application during air inversions. If a spray thickening agent is used, follow all use recommendations and precautions on the product label.

†Reference within this label to a particular piece of equipment produced by or available from other parties is provided without consideration for use by the reader at its discretion and subject to the reader's independent circumstances, evaluation, and expertise. Such reference by SePRO Corporation is not intended as an endorsement of such equipment, shall not constitute a warranty (express or implied) of such equipment, and is not intended to imply that other equipment is not available and equally suitable. Any discussion of methods of use of such equipment does not imply that the reader should use the equipment other than is advised in directions available from the equipment's manufacturer. The reader is responsible for exercising its own judgment and expertise, or consulting with sources other than SePRO Corporation, in selecting and determining how to use its equipment.

Spray Drift Management

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications:

1. The distance of the outer most operating nozzles on the boom must not exceed 3/4 the length of the rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

Where states have more stringent regulations, they should be observed.

The applicator should be familiar with and take into account the information covered in the following *Aerial Drift Reduction Advisory*. [This information is advisory in nature and does not supersede mandatory label requirements.]

Aerial Drift Reduction Advisory

Information on Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see *Wind, Temperature and Humidity, and Temperature Inversions*).

Controlling Droplet Size:

- **Volume** - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure** - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of Nozzles** - Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle Orientation** - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length: For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

Wind: Drift potential is lowest between wind speeds of 2 to 10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential.

Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions: Applications should not occur during a local, low level temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of the smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas: The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

Ground Equipment: To aid in reducing spray drift, Renovate 3 should be used in thickened (high viscosity) spray mixtures using a labeled drift control additive, high viscosity invert system, or equivalent as directed by the manufacturer. With ground equipment, spray drift can be reduced by keeping the spray boom as low as possible; by applying 20 gallons or more of spray per acre; by keeping the operating spray pressures at the lower end of the manufacturer's recommended pressures for the specific nozzle type used (low pressure nozzles are available from spray equipment manufacturers); and by spraying when wind velocity is low (follow state regulations). In hand-gun applications, select the minimum spray pressure that will provide adequate plant coverage (without forming a mist). Do not apply with nozzles that produce a fine-droplet spray.

High Volume Leaf-Stem Treatment: To minimize spray drift, do not use pressure exceeding 50 psi at the spray nozzle and keep sprays no higher than brush tops. A labeled thickening agent may be used to reduce drift.

Plants Controlled

Woody Plant Species

alder	choke cherry
arrowwood	cottonwood
ash	crataegus (hawthorn)
aspen	locust
bear clover (bearmat)	maleleuca (seedlings)
beech	maples
birch	mulberry
blackberry	oaks
blackgum	poison ivy
Brazilian pepper	poison oak
casacara	poplar
ceanothus	salt-bush (<i>Baccharis</i> spp.)
cherry	sweetgum
Chinese tallow	waxmyrtle
chinquapin	willow

Annual and Perennial Broadleaf Weeds

burdock	smart weed
Canada thistle	tansy ragwort
curly dock	tropical sodaapple
elephant ear	vetch
plantain	wild lettuce

Aquatic Weeds

alligatorweed	Pennywort
American lotus	phragmites
American frogbit	pickerelweed
aquatic sodaapple	purple loosestrife
Eurasian watermilfoil	waterhyacinth
milfoil species	waterlily
nuphar (spatterdock)	watershield
parrotfeather†	water primrose

† Retreatment may be needed to achieve desired level of control.

APPLICATION METHODS

FLOATING AND EMERGED WEEDS

For control of waterhyacinth, alligatorweed (see specific directions below), and other susceptible emerged and floating herbaceous weeds and woody plants, apply 1 1/2 to 6 lb ae of triclopyr (2 to 8 quarts of Renovate 3) per acre as a foliar application using surface or aerial equipment. Use higher rates in the rate range when plants are mature, when the weed mass is dense, or for difficult to control species. Repeat as necessary to control regrowth and plants missed in the previous operation, but do not exceed a total of 6 lb ae of triclopyr (8 quarts of Renovate 3) per acre per annual growing season.

Use a non-ionic surfactant in the spray mixture to improve control. Follow all directions and use precautions on the aquatic surfactant label. Apply when plants are actively growing.

Surface Application

Use a spray boom, handgun or other similar suitable equipment mounted on a boat or vehicle. Thorough wetting of foliage is essential for maximum effectiveness. Use 20 to 200 gallons per acre of spray mixture. Special precautions such as the use of low spray pressure, large droplet producing nozzles or addition of a labeled thickening agent may minimize spray drift in areas near sensitive crops.

Aerial Application (Helicopter Only)

Apply with a helicopter using a Microfoil or Thru-Valve boom, or a drift control additive in the spray solution. Apply in a minimum of 10 gallons of total spray mix per acre. Do not apply when weather conditions favor drift to sensitive areas. See label section on aerial application directions and precautions.

Waterhyacinth (*Eichhornia crassipes*)

Apply Renovate 3 at 1 1/2 to 6 lb ae of triclopyr (2 to 8 quarts of Renovate 3) per acre to control waterhyacinth. Apply when plants are actively growing. Use the higher rate in the rate range when the weed mass is dense. It is important to thoroughly wet all foliage with the spray mixture. Use a non-ionic surfactant in the spray mixture. A repeat treatment may be needed to control regrowth or plants missed in the previous treatment.

Alligatorweed (*Alternanthera philoxeroides*)

Apply Renovate 3 at 2 to 6 lb ae of triclopyr (3 to 8 quarts of Renovate 3) per acre to control alligatorweed. It is important to thoroughly wet all foliage with the spray mixture. For best results, add an approved non-ionic aquatic surfactant to the spray mixture. Alligatorweed growing outside the margins of a body of water can be controlled with this treatment. However, alligatorweed growing in water will only be partially controlled. Top growth above the water will be controlled, but the plant will likely regrow from tissue below the water surface.

Precautions for Potable Water Intakes – Lakes, Reservoirs, Ponds:

For applications of Renovate 3 to control floating and emerged weeds in lakes, reservoirs or ponds that contain a functioning potable water intake for human consumption, see chart below to determine the minimum setback distances of the application from the functioning potable water intakes.

Renovate 3 Application Rate				
Area Treated (acres)	2 qt/acre	4 qt/acre	6 qt/acre	8 qt/acre
	Setback Distance (ft)			
<4	0	200	400	500
>4 - 8	0	200	700	900
>8 - 16	0	200	700	1,000
>16	0	200	900	1,300

Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes. These setback restrictions do not apply to terrestrial applications made adjacent to potable water intakes.

To apply Renovate 3 around and within the distances noted above from a functioning potable water intake, the intake must be turned off until the triclopyr level in the intake water is determined to be 0.4 parts per million (ppm) or less by laboratory analysis or immunoassay.

- **Recreational Use of Water in Treatment Area:** There are no restrictions on use of water in the treatment area for recreational purposes, including swimming and fishing.
- **Livestock Use of Water from Treatment Area:** There are no restrictions on livestock consumption of water from the treatment area.

SUBMERGED WEEDS

For control of Eurasian watermilfoil (*Myriophyllum spicatum*) and other susceptible submerged weeds in ponds, lakes, reservoirs, and in non-irrigation canals or ditches that have little or no continuous outflow, apply Renovate 3 as either a surface or subsurface application. Rates should be selected according to the rate chart below to provide a triclopyr concentration of 0.75 to 2.5 ppm ae in treated water. Use higher rates in the rate range in areas of greater water exchange. These areas may require a repeat application. However, total application of Renovate 3 must not exceed an application rate of 2.5 ppm of triclopyr for the treatment area per annual growing season.

Apply in spring or early summer when Eurasian watermilfoil or other submerged weeds are actively growing.

Areas near susceptible crops or other desirable broadleaf plants may be treated by subsurface injection applied by boat to avoid spray drift.

Subsurface Application

Apply desired amount of Renovate 3 per acre directly into the water through boat-mounted distribution systems. When treating target plants that are 6 feet below the surface of the water, trailing hoses should be used along with an aquatic approved sinking agent (except California).

Surface Application

Apply the desired amount of Renovate 3 as either a concentrate or a spray mixture in water. However, use a minimum spray volume of 5 gallons per acre. Do not apply when weather conditions favor drift to sensitive areas.

Average water depth (feet) x 0.905 x target concentration (ppm) = gallons of Renovate 3 per surface acre treated.

Example: to achieve a 2 ppm concentration of triclopyr in water averaging 4 feet deep

4 x 0.905 x 2 ppm = 7.2 gallons of Renovate 3 per surface acre treated.

Concentration of Triclopyr Acid in Water (ppm ae)					
Water Depth (ft)	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
	Gallons of Renovate 3 per Surface Acre at Specified Depth				
1	0.7	0.9	1.4	1.8	2.3
2	1.4	1.8	2.7	3.6	4.6
3	2.1	2.7	4.1	5.4	6.8
4	2.7	3.6	5.4	7.2	9.1
5	3.4	4.5	6.8	9.0	11.3
6	4.1	5.4	8.1	10.9	13.6
7	4.8	6.3	9.5	12.7	15.8
8	5.5	7.2	10.9	14.5	18.1
9	6.1	8.1	12.2	16.3	20.4
10	6.8	9.0	13.6	18.1	22.6
15	10.2	13.6	20.4	27.2	33.9
20	13.6	18.1	27.2	36.2	45.3

Precautions for Potable Water Intakes – Lakes, Reservoirs, Ponds:

For applications of Renovate 3 to control submerged weeds in lakes, reservoirs or ponds that contain a functioning potable water intake for human consumption, see the chart below to determine the minimum setback distances of the application from the functioning potable water intakes.

Concentration of Triclopyr Acid in Water (ppm ae)					
Area Treated (acres)	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
	Required Setback Distance (ft) from Potable Water Intake				
<4	300	400	600	800	1,000
>4 - 8	420	560	840	1,120	1,400
>8 - 16	600	800	1,200	1,600	2,000
>16 - 32	780	1,040	1,560	2,080	2,600
>32 acres, calculate a setback using the formula for the appropriate rate	Setback (ft) = $(800 \times \ln(\text{acres}) - 160) / 3.33$	Setback (ft) = $(800 \times \ln(\text{acres}) - 160) / 2.50$	Setback (ft) = $(800 \times \ln(\text{acres}) - 160) / 1.67$	Setback (ft) = $(800 \times \ln(\text{acres}) - 160) / 1.25$	Setback (ft) = $(800 \times \ln(\text{acres}) - 160)$

Example Calculation 1: to apply 2.5 ppm Renovate 3 to 50 acres:

$$\begin{aligned} \text{Setback in feet} &= (800 \times \ln(50 \text{ acres}) - 160) \\ &= (800 \times 3.912) - 160 \\ &= 2,970 \text{ feet} \end{aligned}$$

Example Calculation 2: to apply 0.75 ppm Renovate 3 to 50 acres:

$$\begin{aligned} \text{Setback in feet} &= \frac{(800 \times \ln(50 \text{ acres}) - 160)}{3.33} \\ &= \frac{(800 \times 3.912) - 160}{3.33} \\ &= 892 \text{ feet} \end{aligned}$$

Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes. These setback restrictions do not apply to terrestrial applications made adjacent to potable water intakes.

To apply Renovate 3 around and within the distances noted above from a functioning potable water intake, the intake must be turned off until the triclopyr level in the intake water is determined to be 0.4 parts per million (ppm) or less by laboratory analysis or immunoassay.

- **Recreational Use of Water in Treatment Area:** There are no restrictions on use of water in the treatment area for recreational purposes, including swimming and fishing.
- **Livestock Use of Water from Treatment Area:** There are no restrictions on livestock consumption of water from the treatment area.

WETLAND SITES

Wetlands include flood plains, deltas, marshes, swamps, bogs, and transitional areas between upland and lowland sites. Wetlands may occur within forests, wildlife habitat restoration and management areas and similar sites as well as areas adjacent to or surrounding domestic water supply reservoirs, lakes and ponds.

For control of woody plants and broadleaf weeds in these sites, follow use directions and application methods on this label for terrestrial sites associated with wetland areas.

Use Precautions: Minimize overspray to open water when treating target vegetation in and around non-flowing, quiescent or transient water. When making applications to control unwanted plants on banks or shorelines of flowing water, minimize overspray to open water. **Note:** Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat such areas.

Purple Loosestrife (*Lythrum salicaria*)

Purple loosestrife can be controlled with foliar applications of Renovate 3. For broadcast applications, use a minimum of 4 1/2 to 6 lb ae of triclopyr (6 to 8 quarts of Renovate 3) per acre. Apply Renovate 3 when purple loosestrife is at the bud to mid-flowering stage of growth. Follow-up applications for control of regrowth should be made the following year in order to achieve increased control of this weed species. For all applications, a non-ionic surfactant labeled for aquatics should be added to the spray mixture. Follow all directions and use precautions on the label of the surfactant. Thorough wetting of the foliage and stems is necessary to achieve satisfactory control. A minimum spray volume of 50 gallons per acre is recommended for ground broadcast applications.

If using a backpack sprayer, a spray mixture containing 1% to 1.5% Renovate 3 or 5 to 7.6 fl oz of Renovate 3 per 4 gallons of water should be used. All purple loosestrife plants should be thoroughly wetted.

Phragmites (*Phragmites australis*)

Phragmites can be selectively controlled with foliar applications of Renovate 3. For broadcast applications, a minimum of 2 1/4 lb ae of triclopyr (3 quarts of Renovate 3) per acre should be used. For optimum control, apply Renovate 3 when phragmites is in the early stage of growth, 1/2 to 3 feet in height, prior to seed head development. Follow-up applications for control of regrowth may be made the following year in order to achieve increased control of this weed species. For all applications, a non-ionic surfactant labeled for aquatics should be added to the spray mixture. Follow all directions and use precautions on the label of the surfactant. Thorough wetting of the foliage and stems is necessary to achieve satisfactory control. A minimum spray volume of 50 gallons per acre is recommended for ground broadcast applications.

If a backpack sprayer is used, a spray mixture containing 1% to 1.5% of Renovate 3 or 5 to 7.6 fl oz of Renovate 3 per 4 gallons of water should be used. All phragmites foliage should be thoroughly wetted.

Aerial application by helicopter may be needed when treating restoration sites that are inaccessible, remote, difficult to traverse, isolated, or otherwise unsuited to ground application, or in circumstances where invasive exotic weeds dominate native plant populations over extensive areas and efforts to restore native plant diversity are being conducted. By air, apply in a minimum spray volume of 30 gallons per acre using Thru-Valve or Microfoil boom only.

- **Recreational Use of Water in Treatment Area:** There are no restrictions on use of water in the treatment area for recreational purposes, including swimming and fishing.
- **Livestock Use of Water from Treatment Area:** There are no restrictions on livestock consumption of water from the treatment area.

TERRESTRIAL SITES ASSOCIATED WITH WETLAND AREAS

- Apply no more than 2 lb ae of triclopyr (2/3 gallon of Renovate 3) per acre per growing season on range and pasture sites, including rights-of-way, fence rows or any area where grazing or harvesting is allowed.
- On forestry sites, Renovate 3 may be used at rates up to 6 lb ae of triclopyr (2 gallons of Renovate 3) per acre per year.

Use Renovate 3 at rates of 3/4 to 6 lb ae of triclopyr (1/4 to 2 gallons of Renovate 3) per acre to control broadleaf weeds and woody plants. In all cases use the amount specified in enough water to give uniform and complete coverage of the plants to be controlled. Use only water suitable for spraying. Use a labeled non-ionic surfactant for all foliar applications. When using surfactants, follow the use directions and precautions listed on the surfactant manufacturer's label. Use the higher recommended concentrations of surfactant in the spray mixture when applying lower spray volumes per acre. The order of addition to the spray tank is water, spray thickening agent (if used), additional herbicide (if used), and Renovate 3. A labeled aquatic surfactant should be added to the spray tank last or as recommended on the product label. If combined with emulsifiable concentrate herbicides, moderate continuous adequate agitation is required.

Before using any recommended tank mixtures, read the directions and all use precautions on both labels.

For best results, apply when woody plants and weeds are actively growing. When hard to control species such as ash, blackgum, choke cherry, maples, or oaks are prevalent and during applications made in late summer when the plants are mature and during drought conditions, use the higher rates of Renovate 3.

When using Renovate 3 in combination with a 2,4-D herbicide approved for aquatic use, such as DMA 4 IVM, generally the higher rates should be used for satisfactory brush control.

Use the higher dosage rates when brush approaches an average of 15 feet in height or when the brush covers more than 60% of the area to be treated. If lower rates are used on hard to control species, re-sprouting may occur the year following treatment.

High Volume Foliage Treatment

For control of woody plants, use Renovate 3 at the rate of 3 to 6 lb ae of triclopyr (1 to 2 gallons of Renovate 3) per 100 gallons of spray solution, or Renovate 3 at 3/4 to 3 lb ae of triclopyr (1 to 4 quarts of Renovate 3) may be tank mixed with 1/4 to 1/2 gallons of 2,4-D 3.8 lb amine, like DMA 4 IVM, diluted to make 100 gallons of spray solution. Apply at a volume of 100 to 400 gallons of total spray per acre depending upon size and density of woody plants. Coverage should be thorough to wet all leaves, stems, and root collars. (See *General Use Precautions and Restrictions*.) Do not exceed the maximum allowable use rate of 6 lb ae of triclopyr (2 gallons of Renovate 3) per acre per growing season.

Low Volume Foliage Treatment

To control susceptible woody plants, apply up to 15 lb ae of triclopyr (5 gallons of Renovate 3) in 10 to 100 gallons of finished spray. The spray concentration of Renovate 3 and total spray volume per acre may be adjusted according to the size and density of target woody plants and kind of spray equipment used. With low volume sprays, use sufficient spray volume to obtain uniform coverage of target plants including the surfaces of all foliage, stems, and root collars (see *General Use Precautions and Restrictions*). For best results, a labeled aquatic surfactant should be added to all spray mixtures. Match equipment and delivery rate of spray nozzles to height and density of woody plants. When treating tall, dense brush, a truck mounted spray gun with spray tips that deliver up to 2 gallons per minute at 40 to 60 psi may be required. Backpack or other types of specialized spray equipment with spray tips that deliver less than 1 gallon of spray per minute may be appropriate for short, low to moderate density brush.

Cut Surface Treatments (Woody Plants)

Individual plant treatments such as basal bark and cut surface applications may be used on any use site listed on this label at a maximum use rate of 2.67 gallons of Renovate 3 (8 lb ae of triclopyr) per acre. These types of applications are made directly to ungrazed parts of plants and, therefore, are not restricted by the grazing maximum rate of 2/3 of a gallon of Renovate 3 (2 lb ae of triclopyr) per acre.

To control unwanted trees and other listed woody plants, apply Renovate 3, either undiluted or diluted in a 1 to 1 ratio with water as directed below.

With Tree Injector Method

Apply by injecting 1/2 milliliter of undiluted Renovate 3 or 1 milliliter of the diluted solution through the bark at intervals of 3 to 4 inches between centers of the injector wound. The injections should completely surround the tree at any convenient height. **Note: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is injected directly into plants.**

With Hack and Squirt Method

Make cuts at a convenient height around the tree trunk with a hatchet or similar equipment so that the cuts overlap slightly and make a continuous circle around the trunk. Spray 1/2 milliliter of undiluted Renovate 3 or 1 milliliter of the diluted solution into each cut.

With Frill or Girdle Method

Make a single girdle through the bark completely around the tree at a convenient height. Wet the cut surface with undiluted or diluted solution.

Both of the above methods may be used successfully at any season except during periods of heavy sap flow of certain species - for example, maples.

Stump Treatment

Spray or paint the cut surfaces of freshly cut stumps and stubs with undiluted Renovate 3. The cambium area next to the bark is the most vital area to wet.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal. Open dumping is prohibited.

Pesticide Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Nonrefillable containers 5 gallons or less:

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Nonrefillable containers 5 gallons or larger:

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable containers 5 gallons or larger:

Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

TERMS AND CONDITIONS OF USE

If terms of the following *Warranty Disclaimer*, *Inherent Risks of Use*, and *Limitation of Remedies* are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, use by the buyer or any other user constitutes acceptance of the terms under *Warranty Disclaimer*, *Inherent Risks of Use* and *Limitations of Remedies*.

WARRANTY DISCLAIMER

SePRO Corporation warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. SEPRO CORPORATION MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

INHERENT RISKS OF USE

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperature, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of SePRO Corporation or the seller. All such risks shall be assumed by buyer.

LIMITATION OF REMEDIES

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories) shall be limited to, at SePRO Corporation's election, one of the following:

- (1) Refund of purchase price paid by buyer or user for product bought, or
- (2) Replacement of amount of product used.

SePRO Corporation shall not be liable for losses or damages resulting from handling or use of this product unless SePRO Corporation is promptly notified of such loss or damage in writing. In no case shall SePRO Corporation be liable for consequential or incidental damages or losses.

The terms of the *Warranty Disclaimer*, *Inherent Risks of Use*, and this *Limitation of Remedies* cannot be varied by any written or verbal statements or agreements. No employee or sales agent of SePRO Corporation or the seller is authorized to vary or exceed the terms of the *Warranty Disclaimer* or this *Limitation of Remedies* in any manner.

EPA Stamped Notification: 06/13/2008

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® Renovate is a registered trademark of Dow AgroSciences LLC



SePRO Corporation
11550 North Meridian Street, Suite 600
Carmel, IN 46032, U.S.A.

Material Safety Data Sheet



Transportation and Medical Emergency Phone: **1-800-535-5053 (INFOTRAC)**
General Phone: 317-580-8282

EPA Reg. No.: 62719-37-67690
Revision Date: 01/10/2008

Renovate[®] 3 Herbicide

SePRO Corporation Carmel, IN 46032-4565

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: Renovate 3 Herbicide

COMPANY IDENTIFICATION:

SePRO Corporation
11550 North Meridian Street, Suite 600
Carmel, IN 46032-4565
www.sepro.com

Information Phone: 317-580-8282 (Monday - Friday, 8:00 am to 5:00 pm EST)

2. HAZARDOUS IDENTIFICATIONS

EMERGENCY OVERVIEW

Light purple-pink liquid, ammonia-like odor.

- May cause eye irritation with corneal injury.
- May cause skin irritation.
- Toxic to aquatic organisms.

EMERGENCY PHONE NUMBER: 1-800-535-5053

3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS NUMBER	W/W%
Triclopyr TEA Salt	057213-69-1	44.4
Triethylamine	000121-44-8	3.0
Ethanol	000064-17-5	2.1
Other Ingredients, Totaling		50.5

4. FIRST AID MEASURES

EYES: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth to an unconscious person.

INHALATION: No emergency medical treatment necessary.

NOTE TO PHYSICIAN: Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower GI tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. If burn is present treat as any thermal burn, after decontamination.

Exposure to amine vapors may cause minor transient edema of the corneal epithelium (glauropsia) with blurred vision, blue haze, and halos around bright objects. Effects disappear in a few hours and temporarily reduce ability to drive vehicles. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES

FLASH POINT & METHOD USED: 110°F (43°C); TCC

FLAMMABLE LIMITS: Not determined

EXTINGUISHING MEDIA: Alcohol foam and Carbon dioxide.

FIRE AND EXPLOSION HAZARDS: Toxic, irritating vapors may be formed or given off if product is involved in fire. Although product is water-based, it has a flash point due to the presence of small amounts of ethanol and triethylamine.

FIREFIGHTING EQUIPMENT/INSTRUCTIONS: Use positive-pressure, self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

ACTION TO TAKE FOR SPILLS/LEAKS: Contain small spills and absorb with an inert material such as clay or dry sand. Report large spills to **INFOTRAC** at **1-800-535-5053** and contact SePRO Corporation.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Handling:

Keep out of reach of children. Causes irreversible eye damage. Harmful if inhaled or absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic skin reaction in some individuals. Avoid contact with eyes, skin, clothing, breathing vapor, or spray mist. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.

Storage:

Store above 28°F or agitate before use. Store in original container. See product label for handling/storage precautions relative to the end use of this product.

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8. EXPOSURE CONTROL / PERSONAL PROTECTION

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE(S):

- Ethanol (ethyl alcohol): ACGIH TLV and OSHA PEL are 1000 ppm. ACGIH classification is A4.
- Triclopyr TEA Salt: The manufacturer's Hygiene Guideline is 2 mg/M³ as acid equivalent; D-SEN.
- Triethylamine: ACGIH TLV is 1 ppm TWA, 3 ppm STEL, Skin. OSHA PEL is 10 ppm TWA, 15 ppm STEL.

A D-SEN notation following the exposure guideline refers to the potential to produce dermal sensitization, as confirmed by human or animal data.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS:

EYE PROTECTION: Use chemical goggles. Eye wash fountain should be located in immediate work area. If exposure causes eye discomfort, use a full-face respirator.

SKIN PROTECTION: When prolonged or frequently repeated contact could occur, use chemically protective clothing resistant to this material. Selection of specific items such as faceshield, gloves, boots, and apron or full-body suit will depend on operation.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use a NIOSH approved air-purifying respirator.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Light purple-pink liquid

ODOR: Ammonia-like odor

BOILING POINT: Not determined

VAPOR PRESSURE: Not determined

VAPOR DENSITY: Not applicable

SOLUBILITY IN WATER: Miscible

SPECIFIC GRAVITY: 1.135 (68/68°F)

10. STABILITY AND REACTIVITY

STABILITY (Conditions to avoid): Avoid sources of ignition if temperature is near or above flash point.

INCOMPATIBILITY (Specific materials to avoid): Any oxidizing agent. Consult manufacturer for specific cases.

HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen oxides and hydrogen chloride may be formed under fire conditions.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYE: May cause severe irritation with corneal injury, which may result in permanent impairment of vision, even blindness. Chemical burns may occur. Vapor of amines may cause swelling of the cornea resulting in visual disturbances such as blurred or hazy vision. Bright lights may appear to be surrounded by halos. Effects may be delayed and typically disappear spontaneously.

SKIN : Prolonged contact may cause skin irritation with local redness. Repeated contact may cause skin burns. Symptoms may include pain, severe local redness, swelling, and tissue damage. Prolonged or frequently repeated skin contact may cause allergic skin reactions in some individuals. With the dilute mix, no allergic skin reaction is expected. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD₅₀ for skin absorption in rabbits is >5,000 mg/kg.

INGESTION: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Swallowing may result in gastrointestinal irritation or ulceration. The oral LD₅₀ for rats is 2,574 mg/kg (male) and 1,847 mg/kg (female).

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INHALATION: Brief exposure (minutes) is not likely to cause adverse effects.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Effects have been reported on the following organs: liver and kidney.

CANCER INFORMATION: Triclopyr did not cause cancer in laboratory animal studies.

TERATOGENICITY (BIRTH DEFECTS): Triclopyr did not cause birth defects or other effects in the fetus even at doses which caused toxic effects in the mother. Ethanol has been shown to cause birth defects and toxicity to the fetus in laboratory animal tests. It has also been shown to cause human fetotoxicity and/or birth defects when ingested during pregnancy.

REPRODUCTIVE EFFECTS: For triclopyr, in laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

MUTAGENICITY: For triclopyr and ethanol: in-vitro mutagenicity studies were negative. For triclopyr: animal mutagenicity studies were negative. For ethanol: animal mutagenicity studies were negative in some cases and positive in other cases.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING: Based largely or completely on information for triclopyr. Bioconcentration potential is low (BCF <100 or Log Pow <3).

DEGRADATION & PERSISTENCE:

- Biodegradation under aerobic static laboratory conditions is high (BOD₂₀ or BOD₂₈/ThOD >40%).
- The 20-Day biochemical oxygen demand (BOD₂₀) is 0.30 p/p.
- Theoretical oxygen demand (ThOD) is calculated to be 0.75 p/p.

ECOTOXICOLOGY: Material is slightly toxic to aquatic organisms on an acute basis (LC₅₀/EC₅₀ is between 10 and 100 mg/L in most sensitive species).

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities.

This information only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

For non-bulk shipments by land:

This material is not regulated for transport.

For bulk shipments by land:

Proper Shipping Name: COMBUSTIBLE LIQUID, N.O.S (TRIETHYLAMINE, ETHANOL) / COMBUSTIBLE LIQUID/NA1993/PGIII

For shipment by air or vessel:

Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S (TRIETHYLAMINE, ETHANOL)/3/UN1993/PGIII

Class	3
UN Number	UN 1993
Packing Group	III

For additional shipping information contact SePRO Corporation at 317-580-8282 and speak with the Logistics Manager.

Material Safety Data Sheet



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15. REGULATORY INFORMATION

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

Chemical Name	CAS Number	Concentration
Triethylamine	000121-44-8	3%

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

- An Immediate Health Hazard
- A Delayed Health Hazard
- A Fire Hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

Chemical Name	CAS Number	List
Ethanol	000064-17-5	NJ1 NJ3 PA1
Triethylamine	000121-44-8	NJ1 NJ3 PA1 PA3

NJ1=New Jersey Special Health Hazard Substance
(present at > or = to 0.1%).

NJ3=New Jersey Workplace Hazardous Substance
(present at greater than or equal to 1.0%).

PA1=Pennsylvania Hazardous Substance
(present at > or = to 1.0%).

PA3=Pennsylvania Environmental Hazardous Substance
(present at > or = to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA RATINGS):

Category	Rating
Health	3
Flammability	2
Reactivity	0

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT

(CERCLA, OR SUPERFUND): This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Chemical Name	CAS Number	RQ	% in Product
Triethylamine	000121-44-8	5000	3%

RCRA Categorization Hazardous Code: Triethylamine = U404

16. OTHER INFORMATION, USES AND RESTRICTIONS

MSDS STATUS:

Creation Date: 01/22/2003

Revision Date: 01/10/2008 (Sections: 8, 14)

Replaces MSDS Dated: 11/21/2006

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult SePRO Corporation for Further Information.

PULL HERE TO OPEN ►



Reward[®]

Landscape and aquatic herbicide

syngenta[®]

Herbicide

TO PREVENT ACCIDENTAL POISONING, NEVER PUT INTO FOOD, DRINK, OR OTHER CONTAINERS, AND USE STRICTLY IN ACCORDANCE WITH ENTIRE LABEL.

DO NOT USE THIS PRODUCT FOR REFORMULATION.

Active Ingredient:

Diquat dibromide [6,7-dihydrodipyrido (1,2-a:2',1'-c) pyrazinedium dibromide]	37.3%
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<i>Other Ingredients:</i>	62.7%
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<i>Total:</i>	100.0%
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Contains 2 lbs. diquat cation per gal. (3.73 lbs. diquat dibromide per gal.)

KEEP OUT OF REACH OF CHILDREN.

CAUTION

See additional precautionary statements on label.

EPA Reg. No. 100-1091 EPA Est. 100-LA-001

Product of United Kingdom

Formulated in the USA

SCP 1091A-L2G 1009

4034800

2.5 gallons

Net Contents

TM

FIRST AID	
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
If swallowed	<ul style="list-style-type: none"> • 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 in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 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 or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
NOTE TO PHYSICIANS	
<p>To be effective, treatment for diquat poisoning must begin IMMEDIATELY. Treatment consists of binding diquat in the gut with suspensions of activated charcoal or bentonite clay, administration of cathartics to enhance elimination, and removal of diquat from the blood by charcoal hemoperfusion or continuous hemodialysis.</p>	
<p>Have the product container or label with you when calling a poison control center or doctor, or going for treatment.</p>	
HOTLINE NUMBER	
<p>For 24-Hour Medical Emergency Assistance (Human or Animal) or Chemical Emergency Assistance (Spill, Leak, Fire, or Accident), Call 1-800-888-8372</p>	

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

CAUTION

Harmful if inhaled. Harmful if swallowed. Causes moderate eye irritation. Avoid breathing spray mist. Avoid contact with eyes, skin, or clothing.

continued...

PRECAUTIONARY STATEMENTS (*continued*)

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are: barrier laminate, butyl rubber ≥ 14 mils, nitrile rubber ≥ 14 mils. If you want more options, follow the instructions for Category A on an EPA Chemical Resistance Category Selection Chart.

Mixers, Loaders, Applicators and other handlers must wear:

- Coveralls over short-sleeved shirt and short pants or coveralls over long-sleeved shirt and long pants
- Chemical-resistant gloves
- Chemical-resistant footwear plus socks
- Protective eyewear
- Chemical-resistant headgear for overhead exposure
- Chemical-resistant apron when cleaning equipment, mixing, or loading
- Face shield when mixing or loading

Exception: After this product has been diluted to 0.50% Reward or less in water (i.e., the labeled rate for some spot applications), applicators for AQUATIC SURFACE APPLICATIONS must, at a minimum, wear (Note - Mixers and Loaders for this application method must still wear the personal protective equipment (PPE) as described in the above section):

- Long-sleeved shirt and long pants
- Shoes plus socks
- Waterproof gloves
- Protective eyewear

Exception: At a minimum, applicators for AQUATIC SUBSURFACE APPLICATIONS must wear (Note - Mixers and Loaders for this application method must still wear the personal protective equipment (PPE) as described in the above section):

- Short-sleeved shirt and short pants
- Waterproof gloves
- Chemical-resistant footwear plus socks

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 exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Control Statements

Mixers and loaders supporting aerial applications are required to use closed systems that provide dermal protection. The closed system must be used in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4)]. When using the closed system, mixers and loaders' PPE requirements may be reduced or modified as specified in the WPS.

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)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Prolonged contact of the product with the skin may produce burns.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Environmental Hazards

This pesticide is toxic to aquatic invertebrates. **For Terrestrial Uses**, do not apply directly to water, or 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 wash water. **For Aquatic Uses** do not apply directly to water except as specified on this label.

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product must be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of SYNGENTA CROP PROTECTION, LLC or Seller. To the extent permitted by applicable law, Buyer and User agree to hold SYNGENTA and Seller harmless for any claims relating to such factors.

SYNGENTA warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. To the extent permitted by applicable law: (1) this warranty does not extend to the use of the product contrary to label instructions or under conditions not reasonably foreseeable to or beyond the control of Seller or SYNGENTA, and, (2) Buyer and User assume the risk of any such use. To the extent permitted by applicable law, SYNGENTA MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS WARRANTED BY THIS LABEL.

To the extent permitted by applicable law, in no event shall SYNGENTA be liable for any incidental, consequential or special damages resulting from the use or handling of this product. **TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF SYNGENTA AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF SYNGENTA OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

SYNGENTA and Seller offer this product, and Buyer and User accept it, subject to the foregoing Conditions of Sale and Limitation of Warranty and Liability, which may not be modified except by written agreement signed by a duly authorized representative of SYNGENTA.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

READ ENTIRE LABEL. USE STRICTLY IN ACCORDANCE WITH PRECAUTIONARY STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.

Do not apply this product through any type of irrigation system.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 24 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls over short-sleeved shirt and short pants, or coveralls over long-sleeved shirt and long pants
- Chemical-resistant gloves made of any waterproof material
- Chemical-resistant footwear plus socks
- Protective eyewear
- Chemical-resistant headgear for overhead exposure

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Keep all unprotected persons out of operating areas or vicinity where there may be drift.

For terrestrial uses, do not enter or allow entry of maintenance workers into treated areas, or allow contact with treated vegetation wet with spray, dew, or rain, without appropriate protective clothing until spray has dried.

For aquatic uses, do not enter treated areas while treatments are in progress.

SPECIFIC USE DIRECTIONS

Reward Landscape and Aquatic Herbicide is a nonvolatile herbicidal chemical for use as a general herbicide to control weeds in commercial greenhouses and nurseries; ornamental seed crops (flowers, bulbs, etc. – except in the state of California); landscape, industrial, recreational, commercial, residential, and public areas; turf renovation (all turf areas except commercial sod farms); dormant established turfgrass (bermudagrass, zoysiagrass – nonfood or feed crop); and aquatic areas. Absorption and herbicidal action is usually quite rapid with effects visible in a few days. Reward Landscape and Aquatic Herbicide controls weeds by interfering with photosynthesis within green plant tissue. Weed plants should be succulent and actively growing for best results. Rinse all spray equipment thoroughly with water after use. Avoid spray drift to crops, ornamentals, and other desirable plants during application, as injury may result. Application to muddy water may result in reduced control. Minimize creating muddy water during application. Use of dirty or muddy water for Reward Landscape and Aquatic Herbicide dilution may result in reduced herbicidal activity. Avoid applying under conditions of high wind, water flow, or wave action.

SPRAY DRIFT MANAGEMENT

Avoiding spray drift at the application site is the responsibility of the applicator and the grower. The interaction of many equipment- and weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses, or to applications using dry formulations.

- The distance of the outermost nozzles on the boom must not exceed $\frac{3}{4}$ the length of the wing-span or rotor.
- Nozzles must always point backward parallel with the air stream and never be pointed downward more than 45 degrees.

Where states have more stringent regulations, they should be observed.

Droplet Size

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (See **Wind, Temperature and Humidity, and Temperature Inversions**).

Controlling Droplet Size

- **Volume** – Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure** – Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of Nozzles** – Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle Orientation** – Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** – Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length

For some use patterns, reducing the effective boom length to less than $\frac{3}{4}$ of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height

Applications should not be made at a height greater than 10 ft. above the top of the target plants, unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller drops, etc.).

Wind

Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. **Note:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity

When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions

Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas

The pesticide should only be applied when the wind is blowing away from adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, nontarget crops).

COMMERCIAL GREENHOUSES AND NURSERIES

For general weed control in commercial greenhouses (beneath benches), field grown and container stock, and other similar areas, Reward Landscape and Aquatic Herbicide may be applied preplant or postplant preemergence in field grown ornamental nursery plantings or postemergence as a directed spray. Reward Landscape and Aquatic Herbicide may also be applied preemergence in ornamental seed crops (except in the state of California). Avoid contact with desirable foliage as injury may occur. Do not use on food or feed crops.

Spot spray: 1-2 qts. Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 100 gals. of water, or 0.75 oz. (22 mls.) Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 1 gal. of water.

Broadcast: 1-2 pts. Reward Landscape and Aquatic Herbicide in a minimum of 15 gals. of water per acre. Add the labeled rate of a 75% or greater nonionic surfactant per 100 gals. of spray mixture. Use an adequate spray volume to insure good coverage.

ORNAMENTAL SEED CROPS (FLOWERS, BULBS, ETC.) EXCEPT IN THE STATE OF CALIFORNIA

For preharvest desiccation of ornamental seed crops. NOT FOR FOOD OR FIBER CROPS.

Broadcast (Air or Ground): 1.5-2 pts. Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per acre in sufficient water (minimum of 5 gals. by air; 15 gals. by ground) for desiccation and weed burndown. Repeat as needed at no less than 5-day intervals up to three applications. Do not use seed, screenings, or waste as feed or for consumption.

DIRECTIONS FOR LANDSCAPE, INDUSTRIAL, RECREATIONAL, COMMERCIAL, RESIDENTIAL, AND PUBLIC AREAS

Reward Landscape and Aquatic Herbicide provides fast control of broadleaf and grassy weeds in industrial, recreational, golf course, commercial, residential, and public areas.

Reward Landscape and Aquatic Herbicide is a nonselective herbicide that rapidly kills undesirable above ground weed growth in 24-36 hours. Avoid application of Reward Landscape and Aquatic Herbicide to desirable plants.

Reward Landscape and Aquatic Herbicide is a contact/desiccant herbicide; it is essential to obtain complete coverage of the target weeds to get good control. Improper application technique and/or application to stressed weeds may result in unacceptable weed control. For best results, apply to actively growing, young weeds.

Difficult weeds (such as perennial or deeply-rooted weeds) can often be controlled by tank mixing Reward Landscape and Aquatic Herbicide with other systemic-type herbicides. Refer to other product labels for specific application directions.

For residual weed control, tank mix Reward Landscape and Aquatic Herbicide with a preemergent herbicide labeled for the intended use site. When mixing Reward Landscape and Aquatic Herbicide with another herbicide, it is recommended to mix just a small amount first to determine if the mixture is physically compatible before proceeding with larger volumes.

Syngenta has not tested all possible tank mixtures with other herbicides for compatibility, efficacy or other adverse effects. Before mixing with other herbicides Syngenta recommends you first consult your state experimental station, state university or extension agent.

Grounds maintenance weed control: Reward Landscape and Aquatic Herbicide can be used as a spot or broadcast spray to control weeds in public, commercial and residential landscapes, including landscape beds, lawns, golf courses and roadsides. Reward Landscape and Aquatic Herbicide can also be used for weed control around the edges and nonflooded portions of ponds, lakes and ditches.

Trim and Edge weed control: Reward Landscape and Aquatic Herbicide can be used to eliminate undesired grass and broadleaf plant growth in a narrow band along driveways, walkways, patios, cart paths, fence lines, and around trees, ornamental gardens, buildings, other structures, and beneath noncommercial greenhouse benches. Vegetation control with Reward Landscape and Aquatic Herbicide is limited to the spray application width. Do not exceed the labeled rate of Reward Landscape and Aquatic Herbicide as excessive rates may result in staining of concrete-based materials.

Reward Landscape and Aquatic Herbicide, since it does not translocate systemically, can be used as an edging or pruning tool when precisely applied to select areas of grass or to undesirable growth on desirable ornamental bedding plants, ground covers, etc.

Industrial weed control: Reward Landscape and Aquatic Herbicide can be used as a spot or broadcast spray either alone or in combination with other herbicides as a fast burndown or control weeds in rights-of-ways, railroad beds/yards, highways, roads, dividers and medians, parking lots, pipelines, pumping stations, public utility lines, transformer stations and substations, electric utilities, storage yards, and other non-crop areas.

Spot spray: Apply either 1-2 qts. of Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 100 gals. water, or 0.75 oz. (22 mls.) Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 1 gal. of water.

Broadcast: 1-2 pts. Reward Landscape and Aquatic Herbicide per acre in sufficient water to insure good spray coverage. Add the labeled rate of 75% or greater nonionic surfactant per 100 gals. spray mixture. Greater water volumes are necessary if the target plants are tall and/or dense. It is recommended that 60 gals. or greater water volume be used to obtain good coverage of dense weeds.

TURF RENOVATION (ALL TURF AREAS EXCEPT COMMERCIAL SOD FARMS)

To desiccate golf course turf and other turf areas prior to renovation, apply 1-2 pts. of Reward Landscape and Aquatic Herbicide per acre plus the labeled rate of a 75% or greater nonionic surfactant in 20-100 gals. of water (4 teaspoons of Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 1 gal. of water) using ground spray equipment. Apply for full coverage and thorough contact with the turfgrass. Apply only when the turf is dry, free from dew and incidental moisture. For enhanced turf desiccation, especially in the case of thick turfgrass, water volumes should approach 100 gals. of water per acre.

For **suppression** of regrowth and quick desiccation of treated turfgrass, Reward Landscape and Aquatic Herbicide may be mixed with other systemic nonselective or systemic postemergence grassy weed herbicides. Refer to other product labels for specific application directions and restrictions.

Avoid spray contact with, or spray drift to, foliage of ornamental plants or food crops.

Do not graze livestock on treated turf or feed treated thatch to livestock.

DORMANT ESTABLISHED TURFGRASS (BERMUDAGRASS, ZOYSIAGRASS), NONFOOD OR FEED CROP

For control of emerged annual broadleaf and grass weeds, including Little Barley*, Annual Bluegrass, Bromes including Rescuegrass, Sixweeks fescue, Henbit, Buttercup, and Carolina Geranium in established dormant bermudagrass lawns, parks, golf courses, etc.

Apply 1-2 pts. Reward Landscape and Aquatic Herbicide per acre in 20-100 gals. of spray mix by ground as a broadcast application. Add the labeled rate of a 75% or greater nonionic surfactant per 100 gals. of spray mixture.

Bermudagrass must be dormant at application. Application to actively growing bermudagrass may cause delay or permanent injury. Users in the extreme Southern areas should be attentive to the extent of dormancy at the time of application.

*For control of Little Barley, apply Reward Landscape and Aquatic Herbicide prior to the mid-boot stage.

AQUATIC USE DIRECTIONS

New York – Not for Sale or Use in New York State without Supplemental Special Local Needs Labeling.

Necessary approval and/or permits must be obtained prior to application if required. Consult the responsible State Agencies (i.e., Fish and Game Agencies, State Water Conservation authorities, or Department of Natural Resources).

Treatment of dense weed areas may result in oxygen loss from decomposition of dead weeds. This loss of oxygen may cause fish suffocation. Therefore, treat only 1/3 to 1/2 of the water body area at one time and wait 14 days between treatments.

For best results on submersed weeds, Reward Landscape and Aquatic Herbicide should be applied to actively growing (photosynthesizing) weeds when water temperatures have reached or exceeded approximately 50°F, typically during the Spring or early Summer.

For application only to **still water** (i.e. ponds, lakes, and drainage ditches) where there is minimal or no outflow to public waters.

and/or

For applications to **public waters** in ponds, lakes, reservoirs, marshes, bayous, drainage ditches, canals, streams, rivers, and other slow-moving or quiescent bodies of water for control of aquatic weeds. For use by:

- Corps of Engineers; or
- Federal or State Public Agencies (i.e., Water Management District personnel, municipal officials); or
- Applicators and/or Licensees (certified for aquatic pest control) that are authorized by the State or Local government.

Treated water may be used according to the following table or until such time as an approved assay (example: PAM II Spectromatic Method) shows that the water does not contain more than the designated maximum contaminant level goal (MCLG) of 0.02 mg/l. (ppm) of diquat dibromide (calculated as the cation).

Water Use Restrictions Following Applications With Reward Landscape And Aquatic Herbicide (Days)

Application Rate	Drinking	Fishing and Swimming	Livestock/ Domestic Animals Consumption	Spray Tank Applications** and Irrigation to Turf and Landscape Ornamentals	Spray Tank Applications** and Irrigation to Food Crops and Production Ornamentals
2 gals./surface acre	3 days	0	1 day	3 days	5 days
1 gal./surface acre	2 days	0	1 day	2 days	5 days
0.75 gal./surface acre	2 days	0	1 day	2 days	5 days
0.50 gal./surface acre	1 day	0	1 day	1 day	5 days
Spot Spray* (<0.5 gal./surface acre)	1 day	0	1 day	1 day	5 days

*Add a nonionic surfactant (with at least 75% of the constituents active as a spray adjuvant) at the rate recommended by the manufacturer.

**For preparing agricultural sprays for food crops, turf or ornamentals (to prevent phytotoxicity), do not use water treated with Reward Landscape and Aquatic Herbicide before the specified time period.

When the contents of more than one spray tank is necessary to complete a single aquatic application, no water holding restrictions apply between the consecutive spray tanks.

No applications are to be made in areas where commercial processing of fish, resulting in the production of fish protein concentrate or fish meal, is practiced. Before application, coordination and approval of local and/or State authorities must be obtained.

Floating and Marginal Weeds Including:

Water lettuce, *Pistia stratiotes*

Water hyacinth, *Eichhornia crassipes*

Duckweed, *Lemna* spp.

Salvinia spp. (including *S. molesta*)

Pennywort (*Hydrocotyle* spp.)

Frog's Bit¹, *Limnobium spongia*

Cattails, *Typha* spp.

¹Not for use in California

Reward Landscape and Aquatic Herbicide may be applied by backpack, airboat, spray handgun, helicopter, airplane, or similar application equipment that results in thorough spray coverage.

Spot Treatment: Apply Reward Landscape and Aquatic Herbicide at 2 quarts per 100 gallons spray carrier (0.5% solution) with an approved aquatic wetting agent at 0.25-1.0% v/v (1 quart to 1 gallon per 100 gallons water). For cattail control, Reward Landscape and Aquatic Herbicide should be applied prior to flowering at the maximum application rate (8 quarts of Reward Landscape and Aquatic Herbicide/100 gallons spray carrier) plus the wetting agent. Repeat treatments may be necessary for complete control.

Spray to completely wet target weeds but not to runoff. Densely packed weeds or mats may require additional applications due to incomplete spray coverage. Re-treat as needed. For best results, re-treat weed escapes within 2 weeks of the initial treatment.

Broadcast Treatment: Apply Reward Landscape and Aquatic Herbicide at the rate of 0.5-2.0 gallons per surface acre in sufficient carrier along with 16-32 oz./A of an approved wetting agent. Re-treat as necessary for densely populated weed areas. Good coverage is necessary for control of the target weeds.

For duckweed control, apply Reward Landscape and Aquatic Herbicide at 1-2 gallons/A.

Submersed Weeds Including:

- Bladderwort, *Utricularia* spp.
- Hydrilla, *Hydrilla verticillata*
- Watermilfoils (including Eurasian), *Myriophyllum* spp.
- Pondweeds¹, *Potamogeton* spp.
- Coontail, *Ceratophyllum demersum*
- Elodea, *Elodea* spp.
- Brazilian Elodea, *Egeria densa*
- Naiad, *Najas* spp.
- Algae², *Spirogyra* spp. and *Pithophora* spp.

¹Reward Landscape and Aquatic Herbicide controls *Potamogeton* species except Richardson’s pondweed, *P. richardsonii*.

²Suppression only. For control of *Spirogyra* and/or *Pithophora*, use Reward Landscape and Aquatic Herbicide in a tank mix with an approved algaecide.

For severe weed or algae infestations, the use of an approved algaecide either as a pretreatment to the Reward Landscape and Aquatic Herbicide application or in a tank mix, may result in enhanced weed control.

To control submersed weeds, apply Reward Landscape and Aquatic Herbicide in water at 0.5-2.0 gallons per surface acre (per 4 foot water depth). For severe weed infestations, use the 2.0 gallon per surface acre rate. For best results, re-treat as necessary on 14-21 day intervals. The table below shows how many gallons of Reward Landscape and Aquatic Herbicide to apply per surface acre based on water depth.

	Gallons of Reward Landscape and Aquatic Herbicide per Surface Acre Average Water Depth			
	1 Foot	2 Feet	3 Feet	4 Feet
1 gallon/acre rate	0.25 gal.	0.50 gal.	0.75 gal.	1.0 gal.
2 gallon/acre rate	0.50 gal.	1.0 gal.	1.5 gals.	2.0 gals.

Note: For water depths of 2 feet or less including shorelines, do not exceed 1 gallon per surface acre.

Subsurface Applications: Where the submersed weed growth, especially Hydrilla, has reached the water surface, apply either in a water carrier or an invert emulsion through boom trailing hoses carrying nozzle tips to apply the dilute spray below the water surface to insure adequate coverage.

Bottom Placement: Where submersed weeds such as Hydrilla, Bladderwort, or Coontail have reached the water surface and/or where the water is slowly moving through the weed growth, the use of an invert emulsion carrier injecting diluted Reward Landscape and Aquatic Herbicide near the bottom with weighted hoses may improve control. The addition of a copper based algaecide may improve control. If algae are present along with the submersed weeds, a pretreatment with a copper based algaecide may improve overall control.

Surface Application for Submerged Aquatic Weeds: Apply the recommended rate of Reward Landscape and Aquatic Herbicide as a spray in sufficient carrier to fully cover the target area. Applications should be made to ensure complete coverage of the weed areas. In mixed weed populations, use the high rate of application as indicated by weeds present. For dense submersed weeds or water over 2 feet deep, a surface spray is not recommended (Reward Landscape and Aquatic Herbicide should be applied subsurface in these situations.)

If posting is required by your state or tribe – consult the agency responsible for pesticide regulations for specific details.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

Pesticide Storage

Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Do not contaminate feed, foodstuffs, or drinking water. Do not store or transport near feed or food. Store at temperatures above 32°F. For help with any spill, leak, fire, or exposure involving this material, call 1-800-888-8372.

Pesticide Disposal

Open dumping is prohibited. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Handling [less than 5 gallons]

Non-refillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use and disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or 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.

Container Handling [Bulk/Mini-Bulk]

Refillable container. Refill this container with Reward Landscape and Aquatic Herbicide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the person refilling. To clean container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities. If the container is damaged, leaking or obsolete, contact Syngenta Crop Protection at 1-800-888-8372.

For minor spills, leaks, etc., follow all precautions indicated on this label and clean up immediately. Take special care to avoid contamination of equipment and facilities during cleanup procedures and disposal of wastes. In the event of a major spill, fire, or other emergency, call 1-800-888-8372, day or night.

CONTAINER IS NOT SAFE FOR FOOD, FEED, OR DRINKING WATER!

Reward®, the ALLIANCE FRAME 
the SYNGENTA Logo and the PURPOSE ICON 
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For non-emergency (e.g., current product information), call
Syngenta Crop Protection at 1-800-334-9481.

Manufactured for:
Syngenta Crop Protection, LLC
P. O. Box 18300
Greensboro, North Carolina 27419-8300

**SCP 1091A-L2G 1009
4034800**



Landscape and Aquatic Herbicide

TO PREVENT ACCIDENTAL POISONING, NEVER PUT INTO FOOD, DRINK, OR OTHER CONTAINERS, AND USE STRICTLY IN ACCORDANCE WITH ENTIRE LABEL.

DO NOT USE THIS PRODUCT FOR REFORMULATION.

Active Ingredient:	
Diquat dibromide [6,7-dihydrodipyrido (1,2-a:2',1'-c) pyrazinediium dibromide]	37.3%
Other Ingredients:	62.7%
Total:	100.0%

Contains 2 lbs. diquat cation per gal. (3.73 lbs. diquat dibromide per gal.)

See additional precautionary statements in booklet.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. Refer to supplemental labeling under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

EPA Reg. No. 100-1091
EPA Est. 100-LA-001

Reward® and the Syngenta logo are trademarks of a Syngenta Group Company.

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Manufactured for:
Syngenta Crop Protection, LLC
P. O. Box 18300
Greensboro, North Carolina 27119-8300

**SCP 1091A-L2G 1009
4034800**

KEEP OUT OF REACH OF CHILDREN. CAUTION

FIRST AID

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

If swallowed: Call 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 in eyes: Hold eye open and rinse slowly and gently with water for 15-20 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 or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

NOTE TO PHYSICIANS: To be effective, treatment for diquat poisoning must begin **IMMEDIATELY**. Treatment consists of binding diquat in the gut with suspensions of activated charcoal or bentonite clay, administration of cathartics to enhance elimination, and removal of diquat from the blood by charcoal hemoperfusion or continuous hemodialysis.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

HOT LINE NUMBER: For 24-Hour Medical Emergency Assistance (Human or Animal) or Chemical Emergency Assistance (Spill, Leak, Fire, or Accident), Call **1-800-888-8372**.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals CAUTION

Harmful if inhaled. Harmful if swallowed. Causes moderate eye irritation. Avoid breathing spray mist. Avoid contact with eyes, skin, or clothing.

Environmental Hazards: This pesticide is toxic to aquatic invertebrates. For Terrestrial Uses, do not apply directly to water, or 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 wash water. For Aquatic Uses do not apply directly to water except as specified on this label.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

Pesticide Storage: Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Do not contaminate feed, foodstuffs, or drinking water. Do not store or transport near feed or food. Store at temperatures above 32°F. For help with any spill, leak, fire, or exposure involving this material, call 1-800-888-8372.

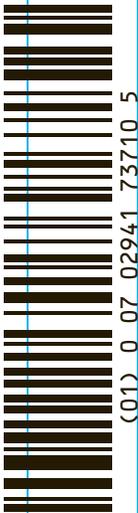
Pesticide Disposal: Open dumping is prohibited. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Handling [less than 5 gallons]: Non-refillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use and disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or 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.

For minor spills, leaks, etc., follow all precautions indicated on this label and clean up immediately. Take special care to avoid contamination of equipment and facilities during cleanup procedures and disposal of wastes. In the event of a major spill, fire, or other emergency, call 1-800-888-8372, day or night.

CONTAINER IS NOT SAFE FOR FOOD, FEED, OR DRINKING WATER!

2.5 gallons
Net Contents



REWARD® Landscape and Aquatic

Date: 12/31/2014
 Replaces: 2/4/2011

1. PRODUCT IDENTIFICATION

Product identifier on label: **REWARD® Landscape and Aquatic**

Product No.: A12872A
 Use: Herbicide
 Manufacturer: Syngenta Crop Protection, LLC
 Post Office Box 18300
 Greensboro NC 27419
 Manufacturer Phone: 1-800-334-9481

Emergency Phone: 1-800-888-8372

2. HAZARDS IDENTIFICATION

Classifications: Corrosive to Metals: Category 1
 Oral: Category 4
 Inhalation: Category 3
 Specific Target Organ Toxicity: Repeated Category 2
 Eye Damage/Irritation: Category 2B

Signal Word (OSHA): **Danger**

Hazard Statements: May be corrosive to metals
 Harmful if swallowed
 Causes eye irritation
 Toxic if inhaled
 May cause damage to organs through prolonged or repeated exposure

Hazard Symbols:



Precautionary Statements: Keep only in original container.
 Do not breathe mist, vapors, spray.
 Wash hands and face thoroughly after handling.
 Do not eat, drink or smoke when using this product.
 Use only outdoors or in a well-ventilated area.
 If swallowed: Call a poison center, doctor or Syngenta if you feel unwell. Rinse mouth.
 If inhaled: Remove person to fresh air and keep comfortable for breathing.
 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 If eye irritation persists: Get medical advice.

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Call a poison center, doctor or Syngenta.
Get medical advice if you feel unwell.
See Section 4 First Aid Measures.
Absorb spillage to prevent material damage.
Store locked up.
Store in corrosive resistant plastic, plastic-lined steel, stainless steel or fiberglass container.
Dispose of contents and container in accordance with local regulations.

Other Hazard Statements: Flammable hydrogen gas may be formed on contact with incompatible metals. See "Conditions to Avoid", Section 10.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Common Name	CAS Number	Concentration
		Trade Secret	
Other ingredients	Other ingredients	Trade Secret	62.7%
[6,7-dihydrodipyrido(1,2-a:2',1'-c)pyrazinediium dibromide]	Diquat Dibromide	85-00-7	37.3%

Ingredients not precisely identified are proprietary or non-hazardous. Values are not product specifications.

4. FIRST AID MEASURES

Have the product container, label or Safety Data Sheet with you when calling Syngenta (800-888-8372), a poison control center or doctor, or going for treatment.

Ingestion: If swallowed: Call Syngenta (800-888-8372), a poison control center or doctor immediately for treatment advice. Have the person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so after calling 800-888-8372 or by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

Eye Contact: If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call Syngenta (800-888-8372), a poison control center or doctor for treatment advice.

Skin Contact: If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call Syngenta (800-888-8372), a poison control center or doctor for treatment advice.

Inhalation: If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call Syngenta (800-888-8372), a poison control center or doctor for further treatment advice.

Most important symptoms/effects:

Eye irritation

Indication of immediate medical attention and special treatment needed:

To be effective, treatment for ingestion of the product must begin IMMEDIATELY. Treatment consists of binding the active ingredient, diquat, in the gut with suspensions of activated charcoal or bentonite clay, administration of cathartics to enhance elimination and removal of diquat from the blood by charcoal hemoperfusion or continuous hemodialysis.

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5. FIRE FIGHTING MEASURES

Suitable (and unsuitable) extinguishing media:

Use dry chemical, foam or CO2 extinguishing media. If water is used to fight fire, dike and collect runoff.

Specific Hazards:

This product may form flammable and explosive hydrogen gas when in contact with aluminum.

During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

Special protective equipment and precautions for firefighters:

Wear full protective clothing and self-contained breathing apparatus. Evacuate nonessential personnel from the area to prevent human exposure to fire, smoke, fumes or products of combustion.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures:

Follow exposure controls/personal protection outlined in Section 8.

Methods and materials for containment and cleaning up:

Control the spill at its source. Contain the spill to prevent from spreading or contaminating soil or from entering sewage and drainage systems or any body of water. Clean up spills immediately, observing precautions outlined in Section 8. Cover entire spill with absorbing material and place into compatible disposal container. Scrub area with hard water detergent (e.g. commercial products such as Tide, Joy, Spic and Span). Pick up wash liquid with additional absorbent and place into compatible disposal container. Once all material is cleaned up and placed in a disposal container, seal container and arrange for disposition.

7. HANDLING AND STORAGE

Precautions for safe handling:

This product reacts with aluminum to produce flammable hydrogen gas. Do not mix or store in containers or systems made of aluminum or having aluminum fittings.

Store the material in a well-ventilated, secure area out of reach of children and domestic animals. Do not store food, beverages or tobacco products in the storage area. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

Conditions for safe storage, including any incompatibilities:

Store locked up.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

THE FOLLOWING RECOMMENDATIONS FOR EXPOSURE CONTROLS/PERSONAL PROTECTION ARE INTENDED FOR THE MANUFACTURE, FORMULATION AND PACKAGING OF THIS PRODUCT.

FOR COMMERCIAL APPLICATIONS AND/OR ON-FARM APPLICATIONS CONSULT THE PRODUCT LABEL.

Occupational Exposure Limits:

Chemical Name	OSHA PEL	ACGIH TLV	Other	Source
Other ingredients	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Diquat Dibromide	Not Established	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA (0.5 total; 0.08 respirable)	Manufacturer

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Appropriate engineering controls:

Use effective engineering controls to comply with occupational exposure limits (if applicable).

Individual protection measures:

Ingestion:

Prevent eating, drinking, tobacco usage and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

Eye Contact:

Where eye contact is likely, use chemical splash goggles.

Skin Contact:

Where contact is likely, wear chemical-resistant gloves (such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyvinyl chloride [PVC] or Viton), coveralls, socks and chemical-resistant footwear.

Inhalation:

A respirator is not normally required when handling this substance. Use effective engineering controls to comply with occupational exposure limits.

In case of emergency spills, use a NIOSH approved respirator with any N, R, P or HE filter.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Dark brown liquid

Odor: Odorless

Odor Threshold: Not Available

pH: 4 - 6

Melting point/freezing point: Not Applicable

Initial boiling point and boiling range: Not Available

Flash Point (Test Method): Not Applicable

Flammable Limits (% in Air): Not Available

Flammability: Not Applicable

Vapor Pressure: Diquat Dibromide < 10(-8) mmHg @ 77°F (25°C)

Vapor Density: Not Available

Relative Density: 1.202 g/ml @ 68°F (20°C)

Solubility (ies): Diquat Dibromide 718,000 mg/l @ 68°F (20°C) and pH 7.2

Partition coefficient: n-octanol/water: Not Available

Autoignition Temperature: Not Applicable

Decomposition Temperature: Not Available

Viscosity: Not Available

Other: None

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10. STABILITY AND REACTIVITY

Reactivity: Not reactive.

Chemical stability: Stable under normal use and storage conditions.

Possibility of hazardous reactions: Will not occur.

Conditions to Avoid: Concentrate should not be stored in aluminum containers. Spray solutions should not be mixed, stored or applied in containers other than plastic, plastic-lined steel, stainless steel or fiberglass.

Incompatible materials: None known.

Hazardous Decomposition Products: Flammable hydrogen gas may be formed on contact with aluminum. See "Conditions to Avoid", Section 10.

11. TOXICOLOGICAL INFORMATION

Health effects information

Likely routes of exposure: Dermal, Inhalation

Symptoms of exposure: Eye irritation

Delayed, immediate and chronic effects of exposure: Eye irritation

Numerical measures of toxicity (acute toxicity/irritation studies (finished product))

Ingestion:	Oral (LD50 Female Rat) :	886 mg/kg body weight
Dermal:	Dermal (LD50 Rabbit) :	> 5050 mg/kg body weight
Inhalation:	Inhalation (LC50 Rat) :	0.62 mg/l air - 4 hours
Eye Contact:	Mildly Irritating (Rabbit)	
Skin Contact:	Slightly Irritating (Rabbit)	
Skin Sensitization:	Not a Sensitizer (Guinea Pig)	

Reproductive/Developmental Effects

Diquat Dibromide: Mutagenicity: No evidence in in vivo assays.

Development Toxicity: In rabbit studies a small percentage of fetuses had minor defects at 3 and 10 mg ion/kg/d.

Chronic/Subchronic Toxicity Studies

Diquat Dibromide: Kidney weight decreases and cataracts seen in dogs at 12.5 mg ion/kg/d.

No evidence for neurotoxic effects in rats dosed up to 400 ppm ion in the diet for 13 weeks.

Carcinogenicity

Diquat Dibromide: No evidence of carcinogenicity in rat and mouse studies.

Chemical Name	NTP/IARC/OSHA Carcinogen
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Other ingredients	No
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[6,7-dihydrodipyrido(1,2-a:2',1'-c)pyrazinediium dibromide]	No
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Other Toxicity Information

None

Toxicity of Other Components

Not Applicable

Other ingredients

Not Applicable

Target Organs

Active Ingredients

Diquat Dibromide: Eye, kidney

Inert Ingredients

: Not Applicable

Other ingredients: Not Applicable

12. ECOLOGICAL INFORMATION

Eco-Acute Toxicity

Diquat Dibromide:

Fish (Rainbow Trout) 96-hour LC50 14.83 ppm

Invertebrate (Water Flea) Daphnia Magna 48-hour EC50 0.77 ppm

Green Algae 4-day EC50 9.4 ppb

Bird (Mallard Duck) 14-day LD50 60.6 mg/kg

Environmental Fate

Diquat Dibromide:

The information presented here is for the active ingredient, diquat dibromide.
Stable in soil and water. Immobile in soil. Sinks in water (after 24 h).

13. DISPOSAL CONSIDERATIONS

Disposal:

Do not reuse product containers. Dispose of product containers, waste containers, and residues according to local, state, and federal health and environmental regulations.

Characteristic Waste: Not Applicable

Listed Waste: Not Applicable

14. TRANSPORT INFORMATION

DOT Classification

Ground Transport - NAFTA

Proper Shipping Name: Corrosive Liquid, N.O.S. (Diquat Dibromide)

Hazard Class: Class 8

Identification Number: UN 1760

Packing Group: PG III

Comments

Water Transport - International

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Proper Shipping Name: Corrosive Liquid, N.O.S. (Diquat Dibromide), Marine Pollutant
 Hazard Class: Class 8
 Identification Number: UN 1760
 Packing Group: PG III

Air Transport
 Proper Shipping Name: Corrosive Liquid, N.O.S. (Diquat Dibromide)
 Hazard Class: Class 8
 Identification Number: UN 1760
 Packing Group: PG III

15. REGULATORY INFORMATION

Pesticide Registration:

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

Caution: Harmful if inhaled. Harmful if swallowed. Causes moderate eye irritation. Avoid breathing spray mist. Avoid contact with eyes, skin, or clothing.

EPA Registration Number(s):
 100-1091

EPCRA SARA Title III Classification:

Section 311/312 Hazard Classes: Acute Health Hazard

Section 313 Toxic Chemicals: None

CERCLA/SARA 304 Reportable Quantity (RQ):

Report product spills \geq 268 gal. (based on diquat [RQ = 1,000 lbs.] content in the formulation)

RCRA Hazardous Waste Classification (40 CFR 261):

Not Applicable

TSCA Status:

Exempt from TSCA, subject to FIFRA

16. OTHER INFORMATION

NFPA Hazard Ratings

Health: 2
 Flammability: 1
 Instability: 0

HMIS Hazard Ratings

Health: 2
 Flammability: 1
 Reactivity: 0

0	Minimal
1	Slight
2	Moderate
3	Serious
4	Extreme
*	Chronic

Syngenta Hazard Category: C,S

For non-emergency questions about this product call:

1-800-334-9481

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Date: 12/31/2014
Replaces: 2/4/2011

Original Issued Date: 6/27/2007
Revision Date: 12/31/2014 Replaces: 2/4/2011
Section(s) Revised: 1-16

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein.

Specimen Label



Rodeo®

Herbicide

®Trademark of Dow AgroSciences LLC

For control of annual and perennial weeds and woody plants in natural and production (plantations), forests for site preparation, mid-rotation release treatments, timber stand improvement activities, noncrop sites including industrial sites, rights-of-way (including roadsides, electric utility and communication transmission lines, pipelines, railroads, airports), irrigation and drainage ditches, canals, reservoirs, natural areas (including wildlife management areas, wildlife openings, wildlife habitats and refuges, parks and recreational areas, campgrounds, trailheads and trails), rangeland, and in and around aquatic sites and wetlands; also for perennial grass release, and grass growth suppression and grazed areas on these sites.

Avoid contact of herbicide with foliage, green stems, exposed non-woody roots or fruit of crops, desirable plants and trees, because severe injury or destruction may result.

Group	9	HERBICIDE
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Active Ingredient:

glyphosate† N-(phosphonomethyl)glycine, isopropylamine salt	53.8%
Other Ingredients.....	46.2%
Total	100.0%

† Contains 5.4 lb per gallon glyphosate, isopropylamine salt (4 lb per gallon glyphosate acid).

Precautionary Statements

Hazards to Humans and Domestic Animals

EPA Reg. No. 62719-324

CAUTION

Harmful If Inhaled

Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Wash thoroughly with soap and water after handling.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks.

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.

Engineering Controls

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

User Safety Recommendations

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.

First Aid

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

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

In case of leak or spill, soak up and remove to a landfill.

Physical or Chemical Hazards

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

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

This is an end-use product. Dow AgroSciences does not intend and has not registered it for reformulation.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves made of any waterproof material
- Shoes plus socks

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses.

Keep people and pets off treated areas until spray solution has dried.

Storage and Disposal

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

Pesticide Storage: 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 roll or shake container or recirculate in mini-bulk containers to mix well before using.

Pesticide Disposal: Wastes resulting from 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.

Nonrefillable containers 5 gallons or less:

Container Handling: Nonrefillable container. Do not reuse or refill this container.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Refillable containers larger than 5 gallons:

Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Then offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Nonrefillable containers 5 gallons or larger:

Container Handling: Nonrefillable container. Do not reuse or refill this container.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. Then offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Product Information

This product is a broad spectrum, systemic, postemergent herbicide with no soil residual activity. It is intended for control of annual and perennial weeds and woody plants and brush. It is formulated as a water soluble liquid.

Time to Symptoms: The active ingredient in this product moves through the plant from the point of foliage contact to and into the root system. Visible effects are a gradual wilting and yellowing of the plant that advances to complete browning of above ground growth and deterioration of underground plant parts. Visible effects on most annual weeds occur within two to four days, but on most perennial weeds visible effects may not occur for seven days or more. Extremely cool or cloudy weather

following treatment may slow the activity of this product and delay development of visual symptoms.

Stage of Weeds: Annual weeds are easiest to control when they are small. Best control of most perennial weeds is obtained when treatment is made at late growth stages approaching maturity. Refer to the annual, perennial and woody brush and trees rate tables for specific weeds. Always use the higher rate within the rate range for heavy or dense weed growth or when weeds are growing in an undisturbed (noncultivated) area. When treating weeds with disease or insect damage, weeds heavily covered with dust, or weeds under poor growing conditions, reduced weed control may result.

Cultural Considerations: Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed, or cut, and have not been allowed to regrow to the specified stage for treatment.

Rainfastness: Heavy rainfall soon after application may wash off this product from the foliage and a repeat application may be required for adequate control.

Spray Coverage: For best results, spray coverage should be uniform and complete.

Mode of Action: The active ingredient in this product inhibits an enzyme. This enzyme is found only in plants and microorganisms that are essential to forming specific amino acids.

No Soil Activity: Weeds must be emerged at the time of application to be controlled by this product. Weeds germinating from seed after application will not be controlled. Unemerged plants arising from unattached underground rhizomes or rootstocks of perennials will not be affected by the herbicide and will continue to grow.

Biological Degradation: Degradation of this product is primarily a biological process carried out by soil microbes.

Maximum Application Rates: The maximum application rates specified in this label are given in units of volume, either fluid ounces, pints or quarts, of this product per acre. The maximum allowed application rates apply to this product combined with the use of any and all other glyphosate- or sulfosate-containing herbicides, either applied separately or in a tank mix, on the basis of total pounds of glyphosate (acid equivalents) per acre. If more than one glyphosate- or sulfosate-containing product is applied to the same site within the same year, ensure that the total of pounds acid equivalent glyphosate does not exceed the maximum allowed.

Do not apply more than 8 quarts of this product (8 lb glyphosate acid) per acre per year for all use sites listed on this label.

IMPORTANT: When using this product, unless otherwise specified, mix with a surfactant, such as a nonionic surfactant containing 80% or greater active ingredient. For conifer release (pine release) use only surfactants that are approved for conifer release and specified on the surfactant label as safe for use in conifer release (pine release). Use of this product without surfactant will result in reduced herbicide performance. Ammonium sulfate, drift control additives, or dyes and colorants may be used. See Mixing Directions and the surfactant manufacturer's label for more information.

Grazing Restrictions: This product may be used to treat undesirable vegetation in utility rights-of-way that pass through pastures, rangeland, and forestry sites that are being grazed. For tank mix applications, comply with all restrictions appearing on the tank mix product label.

Except for lactating dairy animals there are no grazing restrictions following the labeled applications of this product.

For lactating dairy animals there are no grazing restrictions for the following labeled applications of this product:

- Where the spray can be directed onto undesirable woody brush and trees, including in handgun spray to wet or low volume directed spray treatments.
- For tree injection of frill applications and for cut stump treatments.

For broadcast applications, observe the following restrictions for lactating dairy animals:

- For application rates between 4.5 and 7.5 quarts per acre, no more than 15 percent of the available grazing area may be treated.
- For application rates less than 4.5 quarts per acre, no more than 25 percent of the available grazing area may be treated.

These restrictions do not apply to pastures, rangeland or forestry sites outside of utility rights-of-way.

Herbicide Resistance Management

Glyphosate, the active ingredient in this product, is a group 9 herbicide (inhibitor of EPSP synthase). Some naturally occurring weed biotypes that are tolerant (resistant) to glyphosate may exist due to genetic variability in a weed population. Where resistant biotypes exist, the repeated use

of herbicides with the same mode of action can lead to the selection for resistant weeds. Certain agronomic practices reduce the likelihood that resistant weed populations will develop, and can be utilized to manage weed resistance once it occurs.

To delay the selection for glyphosate resistant weeds, use the following practices:

- Scout fields before and after application to detect weed escapes or shifts in weed species.
- Start with a clean field by applying a burndown herbicide or by tillage.
- Control weeds early when they are small.
- Add other herbicides, including a selective and/or a residual herbicide, and cultural practices, including tillage or crop rotation, where appropriate.
- Use the application rate for the most difficult to control weed in the field. Do not tank mix with other herbicides that reduce this product's efficacy through antagonism or with ones that encourage application rates of this product below those specified on this label.
- Control weed escapes and prevent weeds from setting seeds.
- In situations where resistant weeds are a problem, before moving from one site to another, clean equipment to minimize the spread of weed seeds or plant parts.
- Use new commercial seed that is as free of weed seed as possible.
- Report any incidence of repeated non-performance of this product against a particular weed species to the local retailer, county extension agent, or Dow AgroSciences representative.

The following good agronomic practices are recommended to reduce the spread of confirmed glyphosate-resistant biotypes:

- Tank mix this product or apply it sequentially with an appropriately labeled herbicide with a different mode of action to achieve control if a naturally occurring resistant biotype is present in the site.
- Cultural and mechanical control practices, including crop rotation or tillage, may also be used.
- To control weed escapes, including resistant biotypes, before they set seed, scout treated sites after applying this product.
- Thoroughly clean equipment before leaving any site known to contain resistant biotypes.

Because the presence of glyphosate resistance in weed populations is difficult to detect prior to use, Dow AgroSciences accepts no liability for any losses that may result from the failure of this product to control glyphosate-resistant weeds.

Attention

Avoid contact of herbicide with foliage, green stems, exposed non-woody roots or fruit of crops, desirable plants and trees, because severe injury or destruction may result.

AVOID DRIFT. Use extreme care when applying this product to prevent injury to desirable plants and crops.

Do not allow the herbicide solution to mist, drip, drift or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants or other areas on which treatment was not intended. The likelihood of injury occurring from the use of this product increases when winds are gusty, as wind velocity increases, when wind direction is constantly changing, or when there are other meteorological conditions that favor spray drift. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. **Avoid applying at excessive speed or pressure.**

NOTE: Use of this product in any manner not consistent with this label may result in injury to persons, animals or crops, or other unintended consequences. Keep container closed to prevent spills and contamination.

Spray Drift Management

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions. The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

- The distance of the outermost nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
- Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

Where states have more stringent regulations, they must be observed.

The applicator should be familiar with and take into account the information covered in the Aerial Drift Reduction Advisory.

Aerial Drift Reduction Advisory

This section is advisory in nature and does not supersede the mandatory label requirements.

Importance of Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent adverse effects from drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

Controlling Droplet Size:

- **Volume** - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure** - Do not exceed the nozzle manufacturer's recommended pressures. Use the lower spray pressures for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of Nozzles** - Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle Orientation** - Orienting nozzles so that the spray is parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length: For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height: Applications must not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller drops, etc.).

Wind: Drift potential is lowest between wind speeds of 2 to 10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Do not apply this product when wind speed is below 2 mph due to variable wind direction and high inversion potential. **Note:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions: Do not apply this product during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a connected cloud (under low wind conditions) indicates an inversion, while smoke that moves upwards and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas: Apply this pesticide only when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

Mixing Directions

Use only clean, stainless steel, fiberglass, plastic or plastic-lined steel containers to mix, store and apply spray solutions of this product. 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.

Eliminate any risk of siphoning the contents of the tank mix back into the carrier source while mixing. Use approved anti-back-siphoning devices where required by state or local regulations.

Note: Reduced results may occur if water containing soil is used, including visibly muddy water or water from ponds and ditches that is not clear.

Rodeo – Alone

This product mixes readily with water. Mix spray solutions of this product as follows:

1. Fill the mixing or spray tank with the required amount of clean water.
2. Add the specified amount of this product and nonionic surfactant near the end of the filling process and mix well.
3. During mixing and application, foaming of the spray solution may occur. To prevent or minimize foaming, avoid the use of mechanical agitators, terminate by-pass and return lines at the bottom of the tank and, if needed, use an approved anti-foam or defoaming agent.

Rodeo – Tank Mix

This product does not provide residual weed control. For residual weed control or an alternate mode of action, tank mix this product with other herbicides. Read and carefully observe the precautionary statements and all other information appearing on the labels of all herbicides used. Use according to the most restrictive label directions for each product in the mixture.

Under certain conditions, at certain growth stages, and/or under other circumstances, some tank mix products have the potential to cause injury. Read all labels for products used in the tank mix prior to using them to determine the potential for crop injury.

Tank mixing with other herbicides, insecticides, fungicides, micronutrients or foliar fertilizers may result in reduced weed control or injury. Do not use these products in applications with this product unless otherwise noted in this label. Buyer and all users are responsible for all loss or damage in connection with the use or handling of mixtures of this product with herbicides or other materials that are not expressly specified in this labeling. Mixing this product with herbicides or other materials not specified on this label may result in reduced performance.

The user is responsible for ensuring that the specific application being made is included on the label of the product used in the tank mix when a tank mixture with a generic active ingredient, including 2,4-D, atrazine, dicamba, diuron, or pendimethalin, is used.

Read all individual product labels for all products in the tank mix and observe all precautions and restrictions on the label. Use according to the most restrictive directions for each product in the tank mix. Always predetermine the compatibility of all tank mix products, together in the carrier, by mixing small proportional quantities in advance of mixing and applying them to the use site. Add the tank mix product to the tank as directed by the label. Maintain agitation and add the required amount of this product.

Maintain good agitation at all times until the contents in the tank are sprayed. If the mixture is allowed to settle, thorough agitation is required to resuspend the mixture before spraying resumes. Keep the bypass line on or near the bottom of the tank to minimize foaming. The screen size in the nozzle or line strainers should be no finer than 50 mesh.

Note: If tank mixing with Garlon® 3A herbicide, ensure that Garlon 3A is well mixed with at least 75 percent of the total spray volume before adding this product to the spray tank to avoid incompatibility.

Hand-Held Sprayers

Prepare the desired volume of spray solution by mixing the amount of this product in water as shown in the following table:

Nonionic Surfactant

When using this product, unless otherwise specified, mix with a surfactant, including a nonionic surfactant containing 80% or more active ingredient. For conifer release (pine release), use only surfactants that are approved for conifer release and specified on the surfactant label as safe for use in conifer release. Using this product without surfactant will result in reduced herbicide performance.

Colorants or Dyes

Agriculturally-approved colorants or marking dyes may be added to this product. Colorants or dyes used in spray solutions of this product may reduce performance, especially at lower rates or dilutions. Use colorants or dyes according to the manufacturer's directions.

Drift Control Additives

Drift control additives may be used with all equipment types except wiper applicators, sponge bars and CDA equipment. When a drift control additive is used, read and carefully observe the precautionary statements and all other information appearing on the additive label.

Application Equipment and Application Methods

Chemigation: Do not apply this product through any type of irrigation system.

Apply spray solutions in properly maintained and calibrated equipment capable of delivering desired volumes.

This product may be applied with the following application equipment and application methods.

Aerial Application

Equipment: Fixed wing and helicopter

Do not apply this product using aerial spray equipment except under conditions as specified within this label.

For aerial application in California, refer to the supplemental label entitled for aerial applications in that state for specific instructions, restrictions, and requirements. **Note:** Do not aerially apply this product in a tank mix with dicamba in California.

Avoid drift. Do not apply when winds are gusty or under any other condition which favors drift. Drift may cause damage to any vegetation contacted to which treatment is not intended. To prevent injury to adjacent desirable vegetation, maintain appropriate buffer zones.

Do not directly apply to any body of water.

Use the specified rates of this herbicide in 3 to 25 gallons of water per acre unless otherwise specified on this label. Refer to the specific use directions of this label for volumes and application rates.

Coarse sprays are less likely to drift; therefore, do not use nozzles or nozzle configurations that dispense spray as fine spray droplets. Do not angle nozzles forward into the airstream and do not increase spray volume by increasing nozzle pressure. A drift control additive may be used. When a drift control additive is used, carefully read and observe the precautionary statements and all other information specified on the additive label.

Ensure uniform application. To avoid streaked, uneven or overlapped application, use appropriate marking devices.

Ground Application

Equipment: Boom or boomless systems, pull-type sprayer, floaters, pick-up sprayers, spray coupes and other ground broadcast equipment.

Use the specified rates of this product in 3 to 40 gallons of water per acre as a broadcast spray unless otherwise specified on this label. As density of weeds increases, increase the spray volume within the rate range to ensure complete coverage. Carefully select proper nozzles to avoid spraying a fine mist. For best results with ground application equipment, use flat fan nozzles. Check for even distribution of spray droplets.

Hand-Held and High-Volume Including Backpack Application

Equipment: Knapsack and backpack sprayers, pump up pressure sprayers, handguns, hand wands, mistblowers, lances, and other hand-held and motorized spray equipment used to direct the spray onto weed foliage. **Note:** This product is not registered in Arizona or California for use in mistblowers.

Apply to foliage of vegetation to be controlled. Do not spray to the point of runoff for applications made on a spray to wet basis. Use coarse sprays only. For best results, cover the top half of the plant and at least half of the total foliage. To ensure adequate spray coverage, spray both sides of large or tall woody brush and trees, when foliage is thick and dense, or where there are multiple sprouts.

High Volume Sprays: Prepare a 3/4 to 2 percent solution of this product in water, add a nonionic surfactant and apply to foliage of vegetation to be controlled. For specific rates of application and instructions for control of various annual and perennial weeds, see the Weeds Controlled section.

Make applications on a spray to wet basis with uniform and complete spray coverage. Do not spray to point of runoff.

Low Volume Directed Sprays: This product may be used as a 5 to 10 percent solution in low volume directed sprays for spot treatment of trees and brush. This treatment method is most effective in areas where there is a low density of undesirable trees or brush. If a straight stream nozzle is used, start the application at the top of the targeted vegetation and spray from top to bottom in a lateral zigzag motion. Ensure that at least 50 percent of the leaves are contacted by the spray solution. For flat fan and cone nozzles and with hand-directed mist blowers, mist the application over the foliage of the targeted vegetation. Treat small, open-branched trees only from one side. If the foliage is thick or there are multiple root sprouts, apply from several sides to ensure adequate spray coverage. Prepare the desired volume of spray solution by mixing the amount of this product in water as shown in the following table.

Spray Solution:

Desired Volume	Amount of This Product								
	0.5	0.75	1	1.25	1.5	2	5	8	10
1 gal	2/3 fl oz	1 fl oz	1 1/3 fl oz	1 2/3 fl oz	2 fl oz	2 2/3 fl oz	6 1/2 fl oz	10 1/4 fl oz	13 fl oz
25 gal	1 pt	1 1/2 pt	1 qt	1 1/4 qt	1 1/2 qt	2 qt	1 1/4 gal	2 gal	2 1/2 gal
100 gal	2 qt	3 qt	1 gal	1 1/4 gal	1 1/2 gal	2 gal	5 gal	8 gal	10 gal

2 Tablespoons = 1 fl oz

For best results when using knapsack sprayers, mix the specified amount of product with water in a larger container. Fill the knapsack sprayer with the solution and add the correct amount of surfactant.

Selective Equipment

Equipment: Recirculating sprayers, shielded and hooded sprayers, wiper applicators and sponge bars.

Do not contact desirable vegetation with herbicide. Droplets, mist, foam, or splatter of the herbicide settling on desirable vegetation is likely to result in discoloration, stunting or destruction.

Better results are obtained when more of the weed is exposed to the herbicide solution. Weeds not contacted by the herbicide solution will not be affected. This may occur in dense clumps, severe infestations, or when the height of weeds varies so that not all weeds are contacted. If this occurs, repeat treatment may be necessary.

Shielded and Hooded Applicators: A shielded or hooded applicator directs the herbicide solution onto weeds while shielding desirable vegetation from the herbicide. Use nozzles that provide uniform coverage within the treated area. Keep shields on these sprayers adjusted to protect desirable vegetation. **Exercise extreme care to avoid contact of the herbicide with desirable vegetation.**

Wiper Applicators: Wiper applicators are devices that physically wipe appropriate amounts of this product directly onto the weed. Equipment must be designed, maintained and operated to prevent the herbicide solution from contacting desirable vegetation.

Adjust wiper applicators used over the top of desirable vegetation so that the wiper contact point is at least 2 inches above the desirable vegetation. Better results are obtained when more of the weed is exposed to the herbicide solution. Weeds should be a minimum of 6 inches above the desirable vegetation. Adjust the applicator height to ensure adequate contact with weeds as weeds not contacted by the herbicide solution will not be affected. Poor contact may occur when weeds are growing in dense clumps, in severe weed infestations, or when weed height varies dramatically. If this occurs, repeat treatment may be necessary.

Operate this equipment at ground speeds no more than 5 mph. Performance may be improved by reducing speed in areas of heavy weed infestations to ensure adequate wiper saturation. Better results may be obtained if two applications are made in opposite directions.

Droplets, mist, foam, or splatter of the herbicide settling onto desirable vegetation may result in discoloration, stunting or destruction. Avoid leakage or dripping onto desirable vegetation. Adjust height of applicator to ensure adequate contact with weeds. Keep wiping surfaces clean. Be aware that on sloping ground the herbicide solution may migrate, causing dripping on the lower end and drying of the wicks on the upper end of a wiper applicator.

Do not use wiper equipment when weeds are wet.

Mix only the amount of solution to be used during a one-day period as reduced activity may result from use of leftover solutions. Clean wiper parts by thoroughly flushing with water immediately after using this product.

For best results, use a nonionic surfactant at a rate of 10 percent by volume of total herbicide solution for all wiper applications.

Injection Systems

Equipment: Aerial or ground injection sprayers.

This product may be used in aerial or ground injection spray systems. It may be used as a liquid concentrate or diluted prior to injecting into the spray stream. Do not mix this product with the concentrate of other products when using injection systems.

Controlled Droplet Applicator (CDA)

Equipment: Hand-held or boom-mounted applicators that produce a spray consisting of a narrow range of droplet sizes.

The rate of this product applied per acre by vehicle-mounted CDA equipment must not be less than the amount specified on this label when applied by conventional broadcast equipment. For vehicle-mounted CDA equipment, apply 3 to 15 gallons of water per acre.

For the control of annual weeds with hand-held CDA units, apply a 20 percent solution of this product at a flow rate of 2 fl oz per minute and a walking speed of 1.5 mph (1 1/2 pints of product per acre). For control

of perennial weeds, apply a 20 to 40 percent solution of this product at a flow rate of 2 fl oz per minute and a walking speed of 0.75 mph (3 to 6 pints of product per acre).

CDA equipment produces a spray pattern that is not easily visible. Exercise extreme care to avoid spray or drift contacting the foliage or any other green tissue of desirable vegetation as damage or destruction may result.

Use Sites

Use this product in noncrop areas, including airports, apartment complexes, aquatic sites, Christmas tree farms, commercial sites, Conservation Reserve Program (CRP) areas, ditch banks, driveways, dry ditches, dry canals, fencerows, golf courses, greenhouses, habitat management, industrial areas, lumber yards, manufacturing sites, municipal sites, natural areas, office complexes, ornamentals, parking areas, parks, pastures, petroleum tank farms and pumping installations, plant nurseries, public areas, railroads, rangeland, recreation areas, utility rights-of-way, roadsides, shadehouses, sod or turf seed farms, sports complexes, storage areas, substations, turfgrass areas, utility sites, warehouse areas, wildlife habitat management areas, and in grazed areas on these sites.

Aquatic Sites

This product may be applied to emerged weeds in all bodies of fresh and brackish water that may be flowing, nonflowing or transient including lakes, rivers, streams, ponds, estuaries, rice levees, seeps, irrigation and drainage ditches, canals, reservoirs, wastewater treatment facilities, wildlife habitat restoration and management areas and similar sites.

If aquatic sites are present in the noncrop area and are part of the intended treatment, read and observe the following directions:

- This product does not control plants that are completely submerged or have a majority of their foliage under water.
- There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.
- Consult local and state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.
- To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after the application. The water intake may be turned on prior to 48 hours if the glyphosate level in the intake water is below 0.7 parts per million as determined by laboratory analysis. These aquatic applications may be made **only** in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the application.
- For treatments after draw down of water or in dry ditches, allow 7 days or more after treatment before reintroduction of water to achieve maximum weed control. Apply this product within 1 day after draw down to ensure application to actively growing weeds.
- Floating mats of vegetation may require retreatment. Avoid wash off of sprayed foliage by spray boat or recreational boat backwash or by rainfall within 6 hours of application. Do not re-treat within 24 hours following the initial treatment.
- Applications made to moving bodies of water must be made while traveling upstream to prevent concentration of this herbicide in water. When making any bankside applications, do not overlap more than 1 foot into open water. Do not spray in bodies of water where weeds do not exist. The maximum application rate of 7 1/2 pints per acre must not be exceeded in any single broadcast application that is being made over water.
- When emerged infestations require treatment of the total surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in fish kill.

Restrictions:

- Do not apply this product directly to water within 1/2 mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.),

or within 1/2 mile of an active potable water intake in a standing body of water, such as a lake, pond or reservoir. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.

Wetland Sites

This product may be applied to undesirable vegetation in and around water (aquatic areas) and wetlands found in forestry, utility rights-of-way sites or other site listed on the label, including where these sites are adjacent to or surrounding domestic water supply reservoirs, supply streams, lakes and ponds.

If wetland sites are present, read and observe the following directions:

- There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.
- Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat in such areas.

Restrictions:

- Do not apply this product directly to water within 1/2 mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.), or within 1/2 mile of an active potable water intake in a standing body of water, such as a lake, pond or reservoir. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.
- Do not spray open bodies of water where woody brush, trees and herbaceous weeds do not exist. Do not apply more than 3 3/4 quarts per acre in a single over water broadcast application except in stream crossings in utility right-of-way or where applications will result in less than 20 percent of the total water area being treated. In either of these locations, any specified rate may be applied:

Christmas Tree Plantations

Broadcast Application (Oregon and Washington Only)

Broadcast apply this product over the established Christmas tree species Douglas fir (*Pseudotsuga menziesii*), fir species (*Abies* spp.), pine species (*Pinus* spp.) (except eastern white, loblolly, longleaf, shortleaf, slash), and spruce species (*Picea* spp.). Use 1 quart of this product per acre in 5 to 30 gallons of water per acre. For best results, add up to 10 fl oz of Entry II surfactant per acre. If using a different surfactant, follow the manufacturer's directions for use and ensure conifer safety has been adequately tested for that surfactant. Apply after trees have completed at least a full growing season since planting or transplanting.

Apply only in the fall after the formation of the final conifer resting buds or in the spring prior to initial bud swell. Final resting buds must be fully hardened and in the dormant stage. Applying this product at any other time may result in unacceptable injury to the Christmas trees. Avoid spray pattern overlap as injury may occur.

In some areas, 1 to 2 quarts of this product per acre may be used. Consult your local representative for specific use instructions if rates greater than 1 quart per acre are required.

For best results, do not use drift control additives as they may increase injury to Christmas trees.

Precautions and Restrictions:

- **Preharvest Interval:** Do not apply within 1 full year prior to tree harvest.
- Ensure that adequate buffers are maintained to prevent drift onto nearby desirable crops or vegetation.

Cut Stump

Treat cut stumps in any noncrop site listed on this label. This product will control regrowth of freshly cut stumps and resprouts of many types of woody brush and tree species, some of which are listed below. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut trees or resprouts close to the soil surface. Apply a 50 to 100 percent solution of this product to freshly cut surface immediately after cutting. Delays in application may result in reduced performance. For best results, make applications during periods of active growth and full leaf expansion.

When used according to directions for cut stump application, this product will control, partially control or suppress most woody brush and tree species, some of which are listed below:

Common Name
 alder
 coyotebrush¹
 dogwood¹
 eucalyptus
 hickory¹
 madrone, Pacific
 maple¹
 oak
 peppertree, Brazilian
 Australian-pine,

Scientific Name
Alnus spp.
Baccharis pilularis
Cornus spp.
Eucalyptus spp.
Carya spp.
Arbutus menziesii
Acer spp.
Quercus spp.
Schinus terebinthifolia
Casuarina equisetifolia

Common Name

poplar¹
 reed, giant
 saltcedar
 sweetgum¹
 sycamore¹
 tan oak
 willow

Scientific Name

Populus spp.
Arundo donax
Tamarix ramosissima
Liquidambar styraciflua
Platanus occidentalis
Lithocarpus densiflorus
Salix spp.

¹Do not use this product on these species in the state of California.

Precautions and Restrictions:

- Do not make cut stump applications when the roots of desirable woody brush or trees may be grafted to the roots of the cut stump. Some sprouts, stems, or trees may share the same root system.
- Adjacent trees that are of a similar age, height and spacing may indicate shared roots.
- Injury is likely to occur to non-treated stems or trees when one tree or more that shares a common root is treated.

Injection and Frill (Woody Brush and Trees)

Woody vegetation may be controlled by injection or frill application of this product. Apply this product using suitable equipment that penetrates into the living tissue. Apply the equivalent of 1 mL of this product per each two to three inches of trunk diameter at breast height (DBH). This is best achieved by applying 50 to 100 percent concentration of this product either to a continuous frill around the tree or as cuts evenly spaced around the tree below all branches. As tree diameter increases in size, better results are achieved by applying diluted material to a continuous frill or more closely spaced cuttings. Do not make any applications that allow runoff to occur from frilled or cut areas in species that exude sap freely. In species such as this, make frill or cuts at an oblique angle to produce a cupping effect and use a 100 percent undiluted concentration of this product. For best results, apply during periods of active growth and full leaf expansion.

This product controls the following woody species:

Common Name

oak
 poplar
 sweetgum
 sycamore

Scientific Name

Quercus spp.
Populus spp.
Liquidambar styraciflua
Platanus occidentalis

This product suppresses the following woody species:

Common Name

blackgum¹
 dogwood
 hickory
 maple, red

Scientific Name

Nyssa sylvatica
Cornus spp.
Carya spp.
Acer rubrum

¹Do not use this product on these species in the state of California.

Forestry Site Preparation

This product is for the control or partial control of woody brush, trees, and herbaceous weeds in forestry. This product is also for use in preparing or establishing wildlife openings within these sites and maintaining logging roads.

In forestry sites, use this product in site preparation prior to planting any tree species including Christmas trees, eucalyptus, hybrid tree cultivars and silvicultural nursery sites. Unless otherwise specified, make applications of this product for control or partial control of herbaceous weeds, woody brush and trees listed in the Weeds Controlled section.

Application Rates

Method of Application	Rate	Spray Volume (gal/acre)
Broadcast		
aerial	1.5 - 7.5 qt/acre	5 - 30
ground		10 - 60
Spray to Wet		
handgun, backpack	0.75 - 2%	spray to wet
mistblower	by volume	
Low Volume Directed Spray¹		
handgun, backpack	5 - 10%	partial coverage
mistblower	by volume	

¹For low volume directed spray applications, coverage should be uniform with at least 50% of the foliage contacted. For best results, coverage of the top one-half of the plant, including the growing tip, is important (over the top and down coverage). To ensure adequate spray coverage, spray all sides of large or tall woody brush and trees, when foliage is thick and dense, or where there are multiple stems or tall sprouts.

Use a higher rate in the rate range for control or partial control of woody brush, trees and hard to control perennial herbaceous weeds. For best results, apply to actively growing woody brush and trees after full leaf expansion and before leaf drop. Use increased rates within the rate range to control perennial herbaceous weeds from emergence up to the appearance of seedheads, flowers or berries. Use a lower rate in the rate range to control annual herbaceous weeds and actively growing perennial herbaceous weeds after seedheads, flowers or berries appear. Apply to foliage of actively growing annual herbaceous weeds anytime after emergence.

This product has no herbicidal or residual activity in the soil. Where repeat applications are necessary, do not apply more than 8 quarts of product per acre per year.

Tank Mixes

This product may be used in tank mix combination with other herbicide products to broaden the spectrum of vegetation controlled. When tank mixing, read and observe applicable use directions, precautions and limitations on the respective product labels. Use according to the most restrictive precautionary statements for each product in the mixture. Any specified rate of this product may be used in a tank mix.

Note: For forestry site preparation, make sure the tank mix product is approved for use prior to planting the desired species. Observe planting interval restrictions.

Any specified rate of this product may be used in a tank mix with the following products for forestry site preparation:

Product	Method of Application	Rate
Milestone VM ¹	broadcast ³	5 – 7 fl oz/acre
Garlon 3A ²		1 – 4 qt/acre
Garlon 4		
Arsenal Applicators Concentrate		2 – 16 fl oz/acre
Escort		1/2 – 1 1/2 oz/acre
Chopper		4 – 32 fl oz/acre
Oust XP	spray to wet	1 – 4 oz/acre
Arsenal Applicators Concentrate		1/32 – 1/2% by volume
Arsenal Applicators Concentrate		low volume directed spray

¹Use Milestone VM only in those states that have a Special Local Need label for use in forestry.

²Ensure that Garlon 3A is thoroughly mixed with water before adding this product. Agitation is required while mixing this product with Garlon 3A to avoid compatibility problems.

³When using a tank mix partner, up to the maximum labeled rate for a treatment site may be applied in combination with this product.

For control of herbaceous weeds, use the lower specified tank mixture rates. For control of dense stands or difficult to control woody brush and trees, use the higher specified rates.

Aerial Application

Aerially apply this product by helicopter only in forestry sites. See Aerial Application in Application Equipment and Application Methods for more details.

Ground Application

Apply this product using suitable ground equipment for broadcast applications in forestry sites. See Ground Application in Application Equipment and Application Methods for more details. Unless otherwise specified, apply the specified rates of this product as a broadcast spray in sufficient spray volume to provide complete and uniform coverage of plant foliage. Check for even distribution throughout the spray pattern.

Hand-Held and Backpack Application

Apply this product using handgun and backpack equipment in forestry sites. See Hand-Held and Backpack Application in Application Equipment and Application Methods for more details. For spray to wet applications, coverage should be uniform and complete, but not to the point of runoff.

This product may be used for low volume directed sprays for spot treatment of trees and brush. It is most effective in areas where there is a low density of undesirable trees or brush. For flat fan and cone nozzles, spray the foliage of the targeted vegetation. Small, open branched trees need only be treated from one side. If the foliage is thick or there are multiple root sprouts, apply from several sides to ensure adequate spray coverage.

Forestry Conifer and Hardwood Release

Directed Sprays and Selective Equipment

Apply this product as a directed spray or with selective equipment in forestry conifer and hardwood sites, including Christmas tree plantations and silvicultural nurseries. A surfactant must be used with this product. Use only surfactants approved for conifer release and specified on the surfactant label as safe for use in conifer release (pine release). Using this product without a surfactant will result in reduced herbicide performance. See Mixing Directions and Application Equipment and Application Methods sections.

Avoid contact of spray drift, mist or drips with foliage, green bark or non-woody surface roots of desirable plant species.

Tank Mixes: When tank mixing, read and observe applicable use directions, precautions and limitations on the respective product labels. Use according to the most restrictive precautionary statements for each product in the mixture.

Broadcast Application Outside Area of Southeastern United States

Apply this product as a broadcast application for release of Douglas fir (*Pseudotsuga menziesii*), fir (*Abies* species), hemlock (*Tsuga* species), pines (*Pinus* species) (includes all species except loblolly, longleaf, shortleaf, or slash), and California redwood (*Sequoia* species) outside the area of the southeastern United States. Apply this product as a broadcast application only after formation of final conifer resting buds in the fall or prior to initial bud swelling in the spring. Note: Except where specified, make broadcast applications of this product only where conifers have been established for more than one year.

Injury may occur to conifers treated for release, especially where spray patterns overlap or the higher rates are applied. Damage can be accentuated if applications are made when conifers are actively growing, are under stress from drought, flood water, improper planting, insects, animal damage or diseases.

Apply 3/4 to 1 1/2 quarts per acre as a broadcast spray. Apply 3/4 to 1 1/8 quarts of this product per acre to release Douglas fir, pine and spruce species at the end of the first growing season (except California). Ensure all conifers are well hardened off.

A surfactant must be used with this product for optimum weed control. Use only surfactants approved for use in over the top release applications. Using this product without a surfactant will result in reduced herbicide performance. For best results, do not use a surfactant for release of hemlock species or California redwood. In mixed conifer stands, injury to these species may result if a surfactant is used. See Mixing Directions and Application Equipment and Application Methods sections.

For release of Douglas fir, a nonionic surfactant for over the top foliar spray may be used. To avoid possible conifer injury, use nonionic surfactants at 2 fl oz per acre at elevations above 1500 feet, or 1 fl oz per acre in the coastal range or at elevations below 1500 feet. Using a higher rate of surfactant may result in unacceptable conifer injury. Ensure the nonionic surfactant has been adequately tested for safety to Douglas fir before using.

Tank Mixes with Oust XP: Apply 3/4 to 1 1/2 quarts of this product with 1 to 3 oz of Oust XP per acre to release jack pine and white. Use 1 to 1 1/2 oz of Oust XP per acre with this product to release white pine. Make applications to actively growing weeds as a broadcast spray over the top of established conifers. Make applications after formation of conifer resting buds in the late summer or fall.

Tank Mixes with Arsenal Applicators Concentrate: Apply 3/4 to 1 1/8 quarts of this product with 2 to 6 fl oz of Arsenal Applicators Concentrate per acre to release Douglas fir. Apply 1 1/2 quarts of this product with 1 to 2 1/2 fl oz of Arsenal Applicators Concentrate per acre to release balsam fir and red spruce.

In **Maine** and **New Hampshire**, apply up to 2 1/4 quarts of this product per acre to control or suppress difficult to control hardwood species. For the release of red pine, balsam fir, red spruce, white spruce, Norway spruce, and black spruce with dense tough to control brush, and where maples make up a large component of the undesirable trees, this product may be tank mixed with 1 to 2 1/2 fl oz of Arsenal Applicators Concentrate and 1 to 3 oz of Oust XP per acre. Apply this mix as a broadcast spray.

Broadcast Application in Southeastern United States

Apply this product as a broadcast application for release of loblolly pine (*Pinus taeda*), eastern white pine (*Pinus strobus*), shortleaf pine (*Pinus echinata*), slash pine (*Pinus elliottii*), Virginia pine (*Pinus virginiana*), and longleaf pine (*Pinus palustris*) in the southeastern United States.

Apply 1 1/8 to 1 7/8 quarts of this product per acre as a broadcast spray during late summer or early fall after the conifers have hardened off. For applications at the end of the first growing season, use 3/4 quart of this product alone or in a tank mix.

Tank Mixes with Arsenal Applicators Concentrate: For conifer release, apply 3/4 to 1 1/2 quarts of this product with 2 to 16 fl oz of Arsenal Applicators Concentrate per acre as a broadcast spray. Use only on conifer species that are labeled for over the top spray for both products. Use the higher specified rates for dense tough to control wood brush and trees.

Herbaceous Release

When applied as directed, this product plus listed residual herbicides provide postemergence control of the annual weeds and control or suppression of the perennial weeds listed in this label, and residual control of the weeds listed in the residual herbicide label. Make applications to actively growing weeds as a broadcast spray over the top of labeled conifers.

Use a surfactant labeled for use in over the top herbaceous release applications. Using this product without a surfactant will result in reduced herbicide performance. See Mixing Directions and Application Equipment and Application Methods sections on this label.

Weed control may be reduced if spray solution water volumes exceed 25 gallons per acre for these treatments.

Tank Mixes with Oust XP: Apply 12 to 18 fl oz of this product with 2 to 4 oz of Oust XP per acre to release loblolly pines. Apply 9 to 12 fl oz of this product with 2 to 4 oz of Oust XP per acre to release slash pines.

Tank Mix with Atrazine: Apply 3/4 quarts of this product with 4 lb ai of atrazine per acre to release Douglas fir. Apply only over Douglas fir that has been established for at least one full growing season. Apply in the early spring, usually mid-March through early April. Injury will occur if applications are made after bud swell in the spring. For this use, do not add surfactant to the tank mix.

In **Maine** and **New Hampshire**, for release of red pine, balsam fir, red spruce, white spruce, Norway spruce, and black spruce with heavy grass and herbaceous weeds infesting the site, up to 2 1/4 quarts of this product per acre may be tank mixed with 1 to 3 oz of Oust XP to control grass, herbaceous weeds and woody brush. Apply this mix as a broadcast spray.

Mid-Rotation Conifer Release and Spot Treatments for Crop Tree Release and Timber Stand Improvement

This product is applied as a ground broadcast or directed spray application for mid-rotation release applications under the canopy of pines (and other conifers) and hardwoods. Make applications using application techniques that prevent or minimize direct contact to the foliage of crop trees (including in stands of pine, other conifers, or hardwood). This may be accomplished using directed sprays and ground equipment with nozzles oriented to target only undesirable understory vegetation below the crop tree canopy. This product is applied as a spot, individual plant treatment for woody and herbaceous weeds (see Hand-Held and Backpack Application in Application Equipment and Application Methods section). When making spot applications, do not allow spray to contact the foliage of desirable crop trees.

Noncrop Areas and Industrial Sites

See the rate tables in the Annual Weeds, Perennial Weeds, and Woody Brush and Trees sections for specific application rates. This product has no herbicidal or residual activity in the soil. Where repeat applications are necessary, do not apply more than 8 quarts of this product per acre per year.

Use a higher rate in the rate range for control or partial control of woody brush, trees, and hard to control perennial herbaceous weeds. For best results, apply to actively growing woody brush and trees after full leaf expansion and before fall color and leaf drop. Use increased rates within the rate range for difficult to control species, where dense stands occur, or where conditions for control are not ideal and to control perennial herbaceous weeds from emergence up to the appearance of seedheads, flowers or berries. Use a lower rate in the rate range to control annual herbaceous weeds and actively growing perennial herbaceous weeds after seedheads, flowers or berries appear. Apply to foliage of actively growing annual herbaceous weeds anytime after emergence.

Tank Mixing for Noncrop Areas

This product may be used in tank mix combination with other herbicide products to broaden the spectrum of vegetation controlled. When tank mixing, read and observe applicable use directions, precautions and limitations on the respective product labels. Use according to the most restrictive precautionary statements for each product in the mixture. Any specified rate of this product may be used in a tank mix.

Maintain good agitation at all times during the mixing process and application. Ensure that the tank mix product(s) is well mixed with the spray solution before adding this product. Mix only the amount of spray solution that will be used during the same day. Reduced weed control may result if a tank mixture is allowed to stand overnight. If the spray

mix is allowed to settle, thorough agitation is required to resuspend the mixture before spraying is resumed.

Weed Control, Trim and Edge, and Bare Ground

This product may be used in general noncrop and non-food areas. It may be applied with any application equipment described in this label. This product may be used to trim and edge around objects in noncrop sites, for spot treatment of unwanted vegetation, and to eliminate unwanted weeds growing in established shrub beds or ornamental plantings. This product may be used prior to planting an area to ornamentals, flowers, turfgrass (sod or seed), or prior to laying asphalt or beginning construction projects.

To maintain bare ground, repeated applications of this product may be used.

This product provides control of emerged annual weeds and control or partial control of emerged perennial weeds, woody brush and trees when applied in a tank mix to bare ground.

Turfgrass Renovation, Seed or Sod Production

This product controls most existing vegetation prior to renovating turfgrass areas or establishing turfgrass grown for seed or sod. For maximum control of existing vegetation, delay planting or sodding to determine if any regrowth from escaped underground plant parts occurs. When repeat treatments are necessary, sufficient regrowth must be attained prior to application. For warm season turfgrass, including bermudagrass, summer or fall applications provide the best control. Where existing vegetation is growing under mowed turfgrass management, apply this product after omitting at last one regular mowing to allow sufficient grown for good interception of the spray.

Do not disturb soil or underground plant parts before treatment. Delay tillage or renovation techniques, including vertical mowing, coring, or slicing, for seven days after application to allow translocation into underground plant parts.

Desirable turfgrass may be planed following the above procedures.

Hand-held equipment may be used for spot treatment of unwanted vegetation growing in existing turfgrass. Broadcast or hand-held equipment may be used to control sod remnants or other unwanted vegetation after sod is harvested.

Do not feed or graze turfgrass grown for seed or sod production for eight weeks following application.

Ornamentals and Plant Nurseries

Post-Direct and Trim and Edge

This product may be used as a post-directed spray around established woody ornamental species, including arborvitae, azalea, boxwood, crabapple, euonymus, fir, Douglas fir, jojoba, hollies, lilac, magnolia, maple, oak, provet, pine, spruce and yew. This product may also be used to trim and edge around trees, buildings, sidewalks and roads, potted plants and other objects in a nursery setting.

Desirable plants may be protected from the spray solution by using shields or coverings made of cardboard or other impermeable material. Do not use this product for any over the top broadcast spray in ornamentals. Exercise care to avoid contact of spray, drift or mist with foliage or green bark of established ornamental species.

Site Preparation

This product may be used prior to planting any ornamental, nursery or Christmas tree species.

Greenhouse/Shadehouse

This product may be used to control weeds growing in and around greenhouses and shadehouses. Desirable vegetation must not be present during application and air circulation fans must be turned off.

Wildlife Habitat Management

This product may be used to control exotic and other undesirable vegetation in habitat management and natural areas, including rangeland and wildlife refuges. Apply to allow recovery of native plant species, prior to planting desirable native species, and for broad spectrum vegetation control. Apply spot treatments to selectively remove unwanted plants for habitat enhancement.

Wildlife Food Plots

This product may be used as a site preparation treatment to control annual and perennial weeds prior to planting wildlife food plots. Any wildlife food species may be planted after applying this product, or native species may be allowed to repopulate the area. If tillage is needed to prepare a seedbed, wait 7 days after application before tilling to allow translocation into underground plant parts.

Hollow Stem Injection

Apply this product to control giant knotweed (*Polygonum sachalinense*), Japanese knotweed (*Polygonum cuspidatum*), or other invasive knotweeds using individual stem treatment. Use a hand-held injection device that delivers the specified amount of this product into these hollow stem plants.

Make a hole through both sides of the stem about 6 inches above the ground, just below a node, using an awl or other pointed tool. Inject 5 mL of undiluted product directly into this hole in the hollow stem. Treat each stem of the knotweed plant.

Restrictions:

- Do not apply more than a total of 8 quarts of this product per acre for all treatments combined. At 5 mL per stem, 8 quarts will treat approximately 1420 stems per acre.

Parks, Recreational and Residential Areas

Use this product in parks, recreational and residential areas. Apply it with any application equipment described in this label. Use this product to trim and edge around trees, fences, paths, around buildings, sidewalks, and other objects in these areas. This product may be used for spot treatment of unwanted vegetation, eliminate unwanted weeds growing in established shrub beds or ornamental plantings, and prior to planting an area to ornamentals, flowers, turfgrass (sod or seed), or prior to laying asphalt or beginning construction projects.

All of the label instructions apply to park and recreational areas.

Railroads

All of the instructions in the Noncrop Areas and Industrial Sites and Roadside sections apply to railroads.

Bare Ground, Ballast and Shoulders, Crossings, and Spot Treatment

Use this product to maintain bare ground on railroad ballast and shoulders. Repeat applications of this product may be used as weeds emerge to maintain bare ground. Use this product to control tall growing weeds to improve line of sight at railroad crossings and reduce the need for mowing along rights-of-way.

Brush Control

Apply 3 to 8 quarts of this product per acre as a broadcast spray, using boom-type or boomless nozzles. Applications up to 80 gallons of spray solution per acre may be used. Apply a 3/4 to 1.5 percent solution of this product when using high volume spray to wet applications. Apply a 5 to 10 percent solution of this product when using low volume directed sprays for spot treatment.

Roadsides

All of the instructions in the Noncrop Areas and Industrial Sites and Railroads sections apply to roadsides.

Shoulder Treatments

Use this product on road shoulders. Apply it with boom sprayers, shielded boom sprayers, high volume off-center nozzles, OC nozzle clusters, manifold nozzle systems, hand-held equipment, and similar equipment, and under-deck mowing plus herbicide systems..

Guardrails and Other Obstacles to Mowing

Use this product to control weeds growing under guardrails and around signposts and other objects along the roadside.

Spot Treatment

Use this product as a spot treatment to control unwanted vegetation growing along roadsides.

Tank Mixes: This product may be used in tank mix combination with other herbicide products to broaden the spectrum of vegetation controlled and for residual weed control. Follow applicable use directions, precautions and limitations on the respective product labels. Use according to the most restrictive precautionary statements for each product in the mixture. Any specified rate of this product may be used in a tank mix.

Chemical Mowing

Perennials: This product suppresses perennial grasses listed in this section to serve as a substitute for mowing. Use 4.5 fl oz of this product per acre when treating Kentucky bluegrass, tall fescue, fine fescue, orchardgrass, or quackgrass. Apply 12 fl oz of this product per acre when treating bermudagrass. Apply 4.5 to 8 fl oz of this product per acre when treating bahiagrass. Use the higher rates when grass is under heat stress. Apply 3 pints of this product per acre when treating torpedograss or paragrass. Apply treatments in 10 to 20 gallons of spray solution per acre.

Annuals: For growth suppression of some annual grasses, including annual ryegrass, wild barley and wild oats growing in coarse turfgrass on roadsides or other industrial areas, apply 3 to 3.75 fl oz of this product in 10 to 40 gallons of spray solution per acre. Apply when annual grasses

are actively growing and before the seedheads are in the boot stage of development. Treatments may cause injury to the desired grasses.

Release of Dormant Bermudagrass or Bahiagrass

Apply 6 to 48 fl oz of this product per acre in 10 to 40 gallons of water per acre. Use only in areas where bermudagrass or bahiagrass are desirable groundcovers and where some temporary injury or discoloration can be tolerated. Treatments of more than 12 fl oz per acre may result in injury or delayed greenup in highly maintained areas, including golf courses and lawns.

For best results on winter annuals, treat when weeds are in an early growth stage (less than 6 inches in height) after most have germinated. For best results on tall fescue, treat when fescue is in or beyond the 4- to 6-leaf stage.

Tank Mixes: This product may be used in tank mix combination with other herbicide products to broaden the spectrum of vegetation controlled and for residual weed control. When tank mixing, read and follow all applicable use directions, precautions, and limitation on the respective product labels. Use according to the most restrictive precautionary statements for each product in the mixture. Any specified rate of this product may be used in a tank mix.

Actively Growing Bermudagrass

Use this product to control or partially control many annual and perennial weeds for effective release of actively growing bermudagrass. Use only in areas where some temporary injury or discoloration can be tolerated. Use only on well-established bermudagrass. Bermudagrass injury may result from the treatment, but regrowth will occur under moist conditions. Repeat applications of the tank mix in the same season are not specified since severe injury may occur.

Apply up to 2.25 pints of this product in 10 to 40 gallons of spray solution per acre. Use the lower rate when treating annual weeds less than 6 inches in height (or runner length). Use the higher rate as weeds increase in size or as they approach flower or seedhead formation.

Actively Growing Bahiagrass

For suppression of vegetable growth and seedhead inhibition of bahiagrass for approximately 45 days, apply 4.5 fl oz of this product in 10 to 40 gallons of water per acre. Apply one to two weeks after full greenup or after mowing to a uniform height of 3 to 4 inches. Make this application prior to seedhead emergence. For suppression up to 120 days, apply 3 fl oz of this product per acre, followed by an application of 1.5 to 3 fl oz per acre about 45 days later. Make no more than two applications per year.

Tank Mixes: This product may be used in tank mix combination with other herbicide products to broaden the spectrum of vegetation controlled and for residual weed control. When tank mixing, read and follow all applicable use directions, precautions, and limitation on the respective product labels. Use according to the most restrictive precautionary statements for each product in the mixture. Any specified rate of this product may be used in a tank mix.

Utility Sites

Use this product for control of brush, tree, and weed control and side trimming in areas including electrical power, pipeline and telephone rights-of-ways, and other sites associated with these rights-of-ways including substations, roadsides, and railroads. This product may be applied with any application equipment or method described on this label unless specifically prohibited.

Tank Mixes: This product may be used in tank mix combination with other herbicide products to broaden the spectrum of vegetation controlled and for residual weed control. When tank mixing, read and follow all applicable use directions, precautions, and limitation on the respective product labels. Use according to the most restrictive precautionary statements for each product in the mixture. Any specified rate of this product may be used in a tank mix.

Rangelands

Use this product to control or suppress many annual weeds growing in perennial cool and warm season grass rangelands. Preventing weed seed production is critical to the successful control of annual grassy weeds invading these perennial grass sites. Eliminate most of the viable seeds with follow up applications in sequential years. Delay grazing of treated areas to encourage growth of desirable perennials. Allowing desirable perennials to flower and reseed in the treated area will encourage successful transition.

Bromus: Use this product to control or suppress downy brome/cheatgrass (*Bromus tectorum*), Japanese brome (*Bromus japonicus*), soft chess (*Bromus mollis*), cheat (*Bromus secalinus*), cereal rye and jointed goatgrass. Apply 6 to 12 fl oz of this product per acre as a broadcast treatment.

For best results, coincide treatments with early seedhead emergence of the most mature plants. Delaying the application until this growth stage maximizes the emergence of other weedy grass flushes. Make applications to the same site each year until seed banks are depleted and the desirable perennial grasses become established on the site.

Medusahead: Apply 12 fl oz of this product per acre to control or suppress medusahead at the 3-leaf stage when plants are actively growing. Delaying applications beyond this stage results in reduced or unacceptable control. Repeat applications in subsequent years to eliminate the seed bank before reestablishing desirable perennial grasses. Apply in the fall or spring.

Apply by ground or air. Make aerial applications for these uses with fixed wing or helicopter equipment. For aerial applications, apply in 2 to 10 gallons of water per acre. For ground applications, apply in at least 10 to 20 gallons of water per acre.

Spot Treatment and Wiper Application

Apply this product in rangeland, pastures, or industrial sites as a spot treatment or over the top of desirable grasses using wiper applicators to control tall weeds. See Wiper Application section for specific instructions. Make repeat applications in the same area at 30-day intervals.

The entire site or any portion of it may be treated when using 2.25 quarts or less of this product per acre for spot treatments or wiper applications. No more than 10 percent of the total site may be treated at any one time when using more than 2.25 quarts of this product per acre for spot treatments or wiper applications. To achieve maximum performance, remove domestic livestock before application and wait 7 days after application before grazing livestock or harvesting for feed.

Pastures

Type of Pastures: Bahiagrass, bermudagrass, bluegrass, brome, fescue, orchardgrass, ryegrass, timothy, wheatgrass, alfalfa, clover

Spot Treatment and Wiper Application

This product may be applied as a spot treatment or as a wiper application. Make applications in the same area at 30-day intervals. See Wiper Application section for specific instructions.

Precautions and Restrictions:

- For spot treatment and wiper applications, the entire field or any portion of it may be treated when using a rate of 2.25 quarts or less per acre.
- Do not treat more than 10 percent of any acre at one time if applying more than 2.25 quarts per acre as a spot treatment or wiper application.
- To achieve maximum performance, remove domestic livestock before application and wait 14 days after application before grazing livestock or harvesting.

Preplant, Preemergence, and Pasture Renovation

Apply this product prior to planting or emergence of forage grasses and legumes. In addition, this product may be used to control perennial pasture species listed on this label prior to re-planting.

Precautions and Restrictions:

- If the application rates total 2.25 quarts or less per acre, there is no waiting period between treatment and feeding or livestock grazing is required.
- If the application rates total more than 2.25 quarts per acre, remove domestic livestock before application and wait eight weeks after application before grazing or harvesting.
- Crops listed for treatment in this label may be planted into the treated area at any time. Wait 30 days between application and planting for all other crops.

Bamboo

Use this product on roadside rights-of way to control or suppress bamboo. Use the higher rate in the rate range for dense stands and larger plants. Mow or cut bamboo and allow it to resprout to have sufficient foliage in order for the spray solution to completely cover the foliage. Optimum control or suppression of bamboo is achieved when this product is applied between August and October (prior to frost). One application of this product plus a surfactant will not eradicate bamboo. Several mowings and applications are required to completely control bamboo.

Apply the specified rate plus a surfactant (1/4 to 1/2% v/v), such as a nonionic surfactant containing 80% active ingredient or more. Using this product without a surfactant results in reduced performance.

Application Method	Rate	Spray Volume (gal/acre)
ground broadcast	1.5 – 7.5 qt/acre	10 - 60
handgun spray to wet	0.75 – 2%	spray to wet
handgun or backpack low volume directed spray	4 – 10%	spray to cover

Restrictions:

- Do not apply more than a total of 8 quarts of this product per acre per year.

Annual Weeds, Perennial Weeds, and Woody Brush and Trees

Annual Weeds

Apply 24 fl oz of this product per acre if weeds are less than 6 inches in height or runner length. Use 1.25 to 3 quarts of this product per acre if weeds are more than 6 inches in height or runner length or when weeds are growing under stressed conditions. Use a higher rate in the rate range for tough to control species regardless of the size of the weed at the time of application. Treat tough to control weeds when they are relatively small. Tank mix this product with only those products that are labeled for application at the target site. Refer to the label of the tank mix partner for use sites and application rates.

Apply a 0.4 percent solution of this product as a spray to wet application to weeds less than 6 inches in height or runner length. Use a 0.7 to 1.5 percent solution for annual weeds more than 6 inches tall or for smaller weeds growing under stressed conditions. Use the higher concentration for tough to control species or for weeds more than 24 inches tall. Apply prior to seedhead formation in grass or bud formation in broadleaf weeds.

Use a 4 to 7 percent solution of this product for low volume directed spray applications. Spray coverage should be uniform with at least 50 percent of the foliage contacted. For best results, cover the top one-half of the plant. To ensure adequate spray coverage, spray both sides of large or tall weeds when foliage is thick and dense or where there are multiple sprouts.

Common Name

anoda, spurred balsamapple¹
barley
barnyardgrass
bassia, fivehook
bittercress
bluegrass, annual
bluegrass, bulbous
brome, downy/cheatgrass
brome, Japanese
buttercup
Carolina foxtail
Carolina geranium
castorbean
chamomile, mayweed
cheat
chervil
chickweed
cocklebur, common
coreopsis, plains
corn, volunteer
crabgrass
dwarf dandelion, Virginia
eastern mannagrass
eclipta
false dandelion
false flax, smallseed
fiddleneck
field pennycress
fleabane, annual
fleabane, hairy
fleabane, rough
Florida pusley
foxtail
goatgrass, jointed
goosegrass
groundsel, common
henbit
horseweed/marestail
itchgrass
johnsongrass
jungerice
knotweed
kochia²
lambquarters, common
mallow, little
medusahead
morningglory
mustard, blue
mustard, tumble
mustard, wild
oats, wild
panicum, fall
pigweed, redroot
pigweed, smooth
prickly lettuce

Scientific Name

Anoda cristata
Momordica charantia
Hordeum vulgare
Echinochloa crus-galli
Bassia hyssopifolia
Cardamine spp.
Poa annua
Poa bulbosa
Bromus tectorum
Bromus japonicus
Ranunculus spp.
Alopecurus carolinianus
Geranium carolinianum
Ricinus communis
Anthemis cotula
Bromus secalinus
Anthriscus cerefolium
Cerastium vulgatum
Xanthium strumarium
Coreopsis tinctoria
Zea mays
Digitaria spp.
Krigia virginica
Glyceria spp.
Eclipta prostrata
Pyrrhopappus carolinianus
Camelina microcarpa
Amsinckia spp.
Thlaspi arvense
Erigeron annuus
Conyza bonariensis
Erigeron strigosus
Richardia scabra
Setaria spp.
Aegilops cylindrica
Eleusine indica
Senecio vulgaris
Lamium amplexicaule
Conyza canadensis
Rottboellia cochinchinensis
Sorghum halepense
Echinochloa colona
Polygonum spp.
Kochia scoparia
Chenopodium album
Malva parviflora
Taeniatherum caput-medusae
Ipomoea spp.
Chorispora tenella
Sisymbrium altissimum
Sinapis arvensis
Avena fatua
Panicum dichotomiflorum
Amaranthus retroflexus
Amaranthus hybridus
Lactuca serriola

Common Name (Cont.)

puncturevine
purslane, common
ragweed, common
ragweed, giant
rocket, London
Russian-thistle
rye, cereal
ryegrass, Italian³
sandbur, field
sesbania, hemp
shattercane
shepherd's-purse
sicklepod
signalgrass, broadleaf
smartweed, Pennsylvania
sowthistle, annual
Spanishneedles³
speedwell, corn
speedwell, purslane
sprangletop
spurge, annual
spurge, prostrate
spurge, spotted
spurry, umbrella
stinkgrass
sunflower, common
tansymustard, pinnate
teaweed/sida, prickly
Texas panicum
velvetleaf
Virginia pepperweed
wheat
witchgrass
woolly cupgrass
yellow rocket

¹Apply with hand-held equipment only.

²Do not treat kochia in the button stage.

³Apply 3 pints of product per acre.

Perennial Weeds

Best results are obtained when perennial weeds are treated after they reach the reproductive stage of growth (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when non-flowering plants are treated when they reach a mature stage of growth. In many situations, applications are required prior to these growth stages. Under these conditions, use a higher rate in the rate range.

When using spray to wet treatments with hand-held equipment, ensure thorough coverage of the plant. For best results, use a 1.5 percent solution on harder to control perennials including bermudagrass, dock, field bindweed, hemp dogbane, milkweed and Canada thistle.

Use a 4 to 7 percent solution of this product in low volume directed spray applications. Spray coverage should be uniform with at least 50 percent of the foliage contacted. For best results, cover the top one-half of the plant. To ensure adequate spray coverage, spray both sides of large or tall weeds when foliage is thick and dense or where there are multiple sprouts.

Allow 7 days or more after application before tillage.

Common Name

alfalfa
alligatorweed¹
anise/fennel
artichoke, Jerusalem
bahiagrass
beachgrass, European
bentgrass
bermudagrass
bindweed, field
bluegrass, Kentucky
blueweed, Texas
brackenfern
brome, smooth
bursage, woollyleaf
canarygrass, reed
cattail
clover, red
clover, white
cogongrass
cordgrass
cutgrass, giant¹
dallisgrass
dandelion
dock, curly
dogbane, hemp
fescue
fescue, tall
German ivy

Scientific Name

Tribulus terrestris
Portulaca oleracea
Ambrosia artemisiifolia
Ambrosia trifida
Sisymbrium irio
Salsola tragus
Secale cereale
Lolium perenne
Cenchrus spinifex
Sesbania herbacea
Sorghum bicolor
Capsella bursa-pastoris
Senna obtusifolia
Urochloa platyphylla
Polygonum pennsylvanicum
Sonchus oleraceus
Bidens bipinnata
Veronica arvensis
Veronica peregrina
Leptochloa spp.
Chamaesyce spp.
Chamaesyce humistrata
Chamaesyce maculata
Holosteum umbellatum
Eragrostis ciliaris
Helianthus annuus
Descurainia pinnata
Sida spinosa
Panicum spp.
Abutilon theophrasti
Lepidium virginicum
Triticum aestivum
Panicum capillare
Eriochloa villosa
Barbarea vulgaris

Common Name

guineagrass
horsenettle
horseradish
iceplant, crystalline
johnsongrass
kikuyugrass
knawweed, Russian
lantana, largeleaf
lespedeza, common
lespedeza, sericea
loosestrife, purple
lotus, American
maidencane
milkweed
muhly, wirestem
mullein, common
napierrgrass
nightshade, silverleaf
nutsedge, purple
nutsedge, yellow
orchardgrass
pampasgrass
paragrass
phragmites²
poison-hemlock
quackgrass
redvine
reed, giant
ryegrass, perennial
smartweed, swamp
sowthistle, perennial
spatterdock
starthistle, yellow
sweet potato, wild¹
thistle, artichoke
thistle, Canada
timothy
torpedograss¹
trumpet creeper
tules, common
vaseygrass
velvetgrass
waterhyacinth
waterlettuce
waterprimrose
wheatgrass, western

¹ Partial control.

² Partial control in southeastern states.

Woody Brush and Trees

Apply this product after full leaf expansion unless otherwise directed. Use the higher rate for larger plants and/or dense areas of growth. On vines, use the higher rate for plants that have reached the woody stage of growth. Best results are obtained when application is made in late summer or fall after fruit formation.

In arid areas, best results are obtained when applications are made in the spring or early summer when brush species are at high moisture content and are flowering.

Ensure thorough coverage when using hand-held equipment.

See Low Volume Directed Spray Application section of label. Spray coverage should be uniform with at least 50 percent of the foliage contacted. For best results, cover the top half to 2/3 of the plant foliage. Spray both sides of large or tall woody brush and trees to ensure adequate spray coverage when foliage is thick and dense or where there are multiple sprouts. Symptoms may not appear prior to frost or senescence with fall treatments.

Allow seven days or more after application before tillage, mowing or removal. Repeat treatments may be necessary to control plants regenerating from underground parts or seed. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Reduced performance may result if fall treatments are made following a frost.

Note: If brush has been mowed or tilled, or trees have been cut, do not treat until regrowth has reached the specified stage of growth.

This product will control, partially control, or suppress the following woody brush and trees.

Common Name

alder
ash¹
aspens, quaking
bearclover, beararm
beach
birch
bittercherry

Scientific Name

Urochloa maxima
Solanum carolinense
Armoracia rusticana
Mesembryanthemum crystallinum
Sorghum halepense
Pennisetum clandestinum
Acrotilon repens
Lantana camara
Kummerowia striata
Lespedeza cuneata
Lythrum salicaria
Nelumbo lutea
Panicum hemitomon
Asclepias spp.
Muhlenbergia frondosa
Vesicarium thapsus
Pennisetum purpureum
Solanum elaeagnifolium
Cyperus rotundus
Cyperus esculentus
Dactylis glomerata
Cortaderia seloana
Urochloa mutica
Phragmites spp.
Conium maculatum
Elymus repens
Brunnichia ovata
Arundo donax
Lolium perenne
Polygonum amphibium
Sonchus arvensis
Nuphar lutea
Centaurea solstitialis
Ipomoea pandurata
Cynara cardunculus
Cirsium arvense
Phleum pratense
Panicum repens
Campsis radicans
Scirpus acutus
Paspalum urvillei
Holcus spp.
Eichornia crassipes
Pistia stratiotes
Ludwigia spp.
Pascopyrum smithii

Scientific Name

Alnus spp.
Fraxinus spp.
Populus tremuloides
Ceanothus prostratus
Fagus spp.
Betula spp.
Prunus emarginata

Common Name (Cont.)

blackberry
blackgum
blue gum, Tasmanian
brackenfern
broom, French
broom, Scotch
buckwheat, California¹
cascara¹
catclaw-vine¹
ceanothus
chamise
cherry
cherry, black
cherry, pin
copperleaf, hophornbeam
coyotebrush
deer vetch
dewberry, southern
dogwood
elderberry
elm¹
gorse
hasardia¹
hawthorn
hazel
hickory
holly, Florida
honeysuckle
hornbeam, American
kudzu
locust, black¹
madrone, Pacific
manzanita
maple
maple, red¹
maple, sugar
maple, vine¹
monkeyflower¹
oak
oak, black¹
oak, pin
oak, post
oak, red
oak, southern red
oak, white¹
peppertree, Brazilian
persimmon¹
pine
poison-ivy, eastern
poison-oak
poison-sumac¹
prunus
raspberry
redbud, eastern
rose, multiflora
Russian-olive
sage,: black, white
sagebrush, California
salmonberry
saltcedar¹
saltbush, sea myrtle
sassafras
sourwood¹
sumac, smooth¹
sumac, dwarf¹
sweetgum
swordfern¹
tallowtree, Chinese
oak, tanbark resprouts
thimbleberry, western
tobacco, tree¹
trumpetcreeper
Virginia-creeper¹
waxmyrtle, southern¹
willow
yellow-poplar¹
yerba santa

¹Partial control

Scientific Name

Rubus spp.
Nyssa sylvatica
Eucalyptus globulus
Pteridium aquilinum
Genista monspessulana
Cytisus scoparius
Eriogonum fasciculatum
Fragula purshiana
Macfadyena unguis-cati
Ceanothus spp.
Adenostoma fasciculatum
Prunus spp.
Prunus serotina
Prunus pensylvanica
Acalypha ostryifolia
Baccharis pilularis
Lotus unifoliolatus
Rubus trivialis
Cornus spp.
Sambucus nigra
Ulmus spp.
Ulex europaeus
Haplopappus squamosus
Crataegus spp.
Corylus spp.
Carya spp.
Schinus terebinthifolius
Lonicera spp.
Carpinus caroliniana
Pueraria montana
Robinia pseudoacacia
Arbutus menziesii
Arctostaphylos spp.
Acer spp.
Acer rubrum
Acer saccharum
Acer circinatum
Mimulus guttatus
Quercus spp.
Quercus kelloggia
Quercus palustris
Quercus stellata
Quercus rubra
Quercus falcata
Quercus alba
Schinus terebinthifolius
Diospyros spp.
Pknox spp.
Toxicodendron radicans
Toxicodendron spp.
Toxicodendron vernix
Prunus spp.
Rubus spp.
Cercis canadensis
Rosa multiflora
Elaeagnus angustifolia
Salvia spp.
Artemisia californica
Rubus spectabilis
Tamarix ramosissima
Baccharis halimifolia
Sassafras albidum
Oxydendrum arboreum
Rhus glabra
Rhus copallinum
Liquidambar styraciflua
Polystichum munitum
Triadica sebifera
Lithocarpus densiflorus
Rubus parviflorus
Nicotiana glauca
Campsis radicans
Parthenocissus quinquefolia
Myrica cerifera
Salix spp.
Liriodendron tulipifera
Eriodictyon californicum

Warranty Disclaimer

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. To the extent permitted by law, all such risks shall be assumed by buyer.

Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

- (1) Refund of purchase price paid by buyer or user for product bought, or
- (2) Replacement of amount of product used.

Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. To the fullest extent permitted by law, in no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or Limitation of Remedies in any manner.

®Trademark of Dow AgroSciences LLC

**Produced for
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268**

Label Code: D02-148-006
Replaces Label: D02-148-005
LOES Number: 010-01471

EPA accepted 07/07/11

Revisions

1. Added resistance management section.
2. Added use directions for Christmas tree plantations; mid-rotation conifer release and spot treatments for crop tree release and timber stand improvement; noncrop areas and industrial sites; turfgrass renovation, seed or sod production; ornamentals and plant nurseries; hollow stem injection; parks; recreational and residential areas; roadsides; rangelands; pastures; bamboo.
3. Added Brazilian peppertree and Australian-pine to cut stump.
4. Added spurred anoda, bittercress, Japanese brome, Carolina geranium, castorbean, mayweed chamomile, chervil, plains coreopsis, eastern mannagrass, eclipta, faldandelion, hairy fleabane, rough fleabane, Florida pusley, jointed goatgrass, goosegrass, henbit, itchgrass, johnsongrass, junglerice, knotweed, little mallow, medusahead, smooth pigweed, puncturevine, common purslane, hemp sesbania, sicklepod, corn speedwell, purslane speedwell, sprangletop, annual spurge, prostrate spurge, spotted spurge, teaweed/prickly sida, Virginia pepperweed, woolly cupgrass, and yellow rocket to annual weeds.
5. Added European beachgrass, bentgrass, woollyleaf bursage, German ivy, redvine, perennial sowthistle, and trumpetcreeper to perennial weeds.
6. Added beach, blackgum, brackenfern, cherry, hophornbeam copperleaf, deer vetch, gorse, Pacific madrone, maple, oak, Brazilian peppertree, pine, tanbark oak resprouts, and yerba santa to woody brush and trees.

Terms and Conditions of Use

If terms of the following Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitations of Remedies.

Product Name: RODEO Herbicide

Issue Date: 07/06/2011

Print Date: 06 Jul 2011

Dow AgroSciences LLC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

RODEO Herbicide

COMPANY IDENTIFICATION

Dow AgroSciences LLC
A Subsidiary of The Dow Chemical Company
9330 Zionsville Road
Indianapolis, IN 46268-1189
USA

Customer Information Number:

800-992-5994

SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact:

800-992-5994

Local Emergency Contact:

352-323-3500

2. Hazards Identification

Emergency Overview

Color: Yellow

Physical State: Liquid.

Odor: Odorless

Hazards of product:

CAUTION! Combustible liquid and vapor. Vapor explosion hazard. Vapors may travel a long distance; ignition and/or flash back may occur. Isolate area. Stay out of low areas. Warn public of downwind explosion hazard. Eliminate ignition sources.

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause slight temporary eye irritation. Corneal injury is unlikely.

Skin Contact: Essentially nonirritating to skin.

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Inhalation: Brief exposure (minutes) is not likely to cause adverse effects.

Ingestion: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

Effects of Repeated Exposure: For similar material(s): Glyphosate. In animals, effects have been reported on the following organs: Liver.

3. Composition Information

Component	CAS #	Amount
Glyphosate IPA salt	38641-94-0	53.8 %
Isopropylamine	75-31-0	1.0 %
Balance	Not available	45.2 %

4. First-aid measures

Description of first aid measures

Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice.

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

Eye Contact: Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. Call a poison control center or doctor for treatment advice.

Ingestion: No emergency medical treatment necessary.

Most important symptoms and effects, both acute and delayed

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed

No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data Sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

5. Fire Fighting Measures

Suitable extinguishing media

To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Straight or direct water streams may not be effective to extinguish fire. General purpose synthetic foams (including AFFF type) or protein foams are preferred if available. Alcohol resistant foams (ATC type) may function.

Special hazards arising from the substance or mixture

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating.

Unusual Fire and Explosion Hazards: This material will not burn until the water has evaporated. Residue can burn. Container may vent and/or rupture due to fire. Electrically ground and bond all equipment. Flammable mixtures of this product are readily ignited even by static discharge. May produce flash fire. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Flammable mixtures may exist within the vapor space of containers at room temperature.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water may not be effective in extinguishing fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Isolate area. Refer to Section 7, Handling, for additional precautionary measures. Keep unnecessary and unprotected personnel from entering the area. Keep personnel out of low areas. No smoking in area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Vapor explosion hazard. Keep out of sewers. For large spills, warn public of downwind explosion hazard. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Pump with explosion-proof equipment. If available, use foam to smother or suppress. Absorb with materials such as: Clay. Dirt. Sand. Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling

General Handling: Keep away from heat, sparks and flame. No smoking, open flames or sources of ignition in handling and storage area. Electrically bond and ground all containers and equipment before transfer or use of material. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Never use air pressure for transferring product. Keep out of reach of children. Do not swallow. Avoid breathing vapor or mist. Avoid contact with eyes, skin, and clothing. Use with adequate ventilation. Wash thoroughly after handling. Keep container closed.

Storage

Minimize sources of ignition, such as static build-up, heat, spark or flame. Keep container closed. Do not store in: Carbon steel. Galvanized containers. Steel. Flammable mixtures may exist within the vapor space of containers at room temperature. Store in a dry place. Store in original container. Do not store near food, foodstuffs, drugs or potable water supplies.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Isopropylamine	ACGIH	TWA	5 ppm
	ACGIH	STEL	10 ppm
	OSHA Table Z-1	PEL	12 mg/m ³ 5 ppm

RECOMMENDATIONS IN THIS SECTION ARE FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS. APPLICATORS AND HANDLERS SHOULD SEE THE PRODUCT LABEL FOR PROPER PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING.

Personal Protection

Eye/Face Protection: Use safety glasses (with side shields).

Skin Protection: No precautions other than clean body-covering clothing should be needed.

Hand protection: Chemical protective gloves should not be needed when handling this material. Consistent with general hygienic practice for any material, skin contact should be minimized.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Appearance

Physical State	Liquid.
Color	Yellow
Odor	Odorless
Odor Threshold	No test data available
pH	4.6 (@ 1 %) <i>NAPM 11A.00</i> 1% aqueous solution.
Melting Point	Not applicable
Freezing Point	No test data available
Boiling Point (760 mmHg)	110 °C (230 °F) .
Flash Point - Closed Cup	> 93 °C (> 199 °F) <i>Setaflash Closed Cup ASTMD3828</i> none below boiling point
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammable Limits In Air	Lower: No test data available Upper: No test data available
Vapor Pressure	No test data available
Vapor Density (air = 1)	No test data available
Specific Gravity (H ₂ O = 1)	1.211 22 °C/4 °C <i>Pyknometer</i>
Solubility in water (by weight)	Soluble
Autoignition Temperature	none below 400degC
Decomposition Temperature	No test data available
Dynamic Viscosity	64.6 mPa.s @ 20 °C
Kinematic Viscosity	53.4 mm ² /s @ 20 °C
Liquid Density	1.20 g/ml @ 20 °C <i>Digital density meter</i>

10. Stability and Reactivity

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Thermally stable at recommended temperatures and pressures.

Possibility of hazardous reactions

Polymerization will not occur.

Conditions to Avoid: Active ingredient decomposes at elevated temperatures. Avoid static discharge.

Incompatible Materials: Heat produced by the reaction with water will cause vaporization.

Flammable hydrogen may be generated from contact with metals such as:

Hazardous decomposition products

Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information

Acute Toxicity

Ingestion

LD50, Rat > 5,000 mg/kg

Dermal

LD50, Rabbit > 5,000 mg/kg

Inhalation

LC50, 4 h, Aerosol, Rat > 6.37 mg/l

Eye damage/eye irritation

May cause slight temporary eye irritation. Corneal injury is unlikely.

Skin corrosion/irritation

Essentially nonirritating to skin.

Sensitization

Skin

Did not cause allergic skin reactions when tested in guinea pigs.

Repeated Dose Toxicity

For similar material(s): Glyphosate. In animals, effects have been reported on the following organs: Liver.

Chronic Toxicity and Carcinogenicity

For similar material(s): Glyphosate. Did not cause cancer in laboratory animals.

Developmental Toxicity

For the active ingredient(s): Available data are inadequate for evaluation of potential to cause birth defects.

Reproductive Toxicity

For the active ingredient(s): Available data are inadequate to determine effects on reproduction.

Genetic Toxicology

For the active ingredient(s): In vitro genetic toxicity studies were negative in some cases and positive in other cases. For similar material(s): Glyphosate. In vitro genetic toxicity studies were negative.

For similar material(s): Glyphosate. Animal genetic toxicity studies were negative.

12. Ecological Information

Toxicity

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested). Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg).

Fish Acute & Prolonged Toxicity

|| LC50, rainbow trout (*Oncorhynchus mykiss*), 96 h: > 2,500 mg/l

Aquatic Invertebrate Acute Toxicity

|| EC50, water flea *Daphnia magna*, 48 h, immobilization: 918 mg/l

Aquatic Plant Toxicity

|| EC50, green alga *Pseudokirchneriella subcapitata* (formerly known as *Selenastrum capricornutum*), biomass growth inhibition, 72 h: 10 - 127 mg/l

Toxicity to Above Ground Organisms

|| oral LD50, bobwhite (*Colinus virginianus*): > 2,000 mg/kg

|| contact LD50, Honey bee (*Apis mellifera*): > 100 ug/bee

|| oral LD50, Honey bee (*Apis mellifera*): > 100 ug/bee

Persistence and Degradability

|| Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions. For similar active ingredient(s). Biodegradation may occur under aerobic conditions (in the presence of oxygen).

Bioaccumulative potential

|| **Bioaccumulation:** For similar active ingredient(s). Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Mobility in soil

|| **Mobility in soil:** For similar active ingredient(s)., Expected to be relatively immobile in soil (Koc > 5000).

13. Disposal Considerations

If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

14. Transport Information

|| **DOT Non-Bulk**
NOT REGULATED

|| **DOT Bulk**
NOT REGULATED

|| **IMDG**
NOT REGULATED

|| **ICAO/IATA**
NOT REGULATED

|| *This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the*

transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	No
Delayed (Chronic) Health Hazard	Yes
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Isopropylamine	75-31-0	1.0%

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 103

This product contains the following substances which are subject to CERCLA Section 103 reporting requirements and which are listed in 40 CFR 302.4.

Component	CAS #	Amount
Isopropylamine	75-31-0	1.0%

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

Toxic Substances Control Act (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	1	1	0

Revision

Identification Number: 61082 / 1016 / Issue Date 07/06/2011 / Version: 2.0

DAS Code: NAF-552

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

Dow AgroSciences LLC urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

SonarOne[®]

Aquatic Herbicide

SPECIMEN



An herbicide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs, potable water sources, drainage canals, irrigation canals and rivers.

Active Ingredient

fluridone: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1H) pyridinone 5.0%

Other Ingredients 95.0%

TOTAL 100.0%

Contains 0.05 pound active ingredient per pound of product.

Keep Out of Reach of Children

CAUTION / PRECAUCIÓN

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.)

Refer to the inside of the label booklet for additional precautionary information and *Directions for Use* including *Storage and Disposal*.

NOTICE: Read the entire label before using. Use only according to label directions. Before buying or using this product, read *Terms and Conditions of Use, Warranty Disclaimer, Inherent Risks of Use and Limitation of Remedies* inside label booklet.

SonarOne is a registered trademark of SePRO Corporation.

SePRO Corporation 11550 North Meridian Street, Suite 600,
Carmel, IN 46032, U.S.A.

EPA Reg. No. 67690-45
FPL20120928

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION. Harmful If Swallowed. Causes moderate eye irritation. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Avoid contact with eyes or clothing. Wear protective eyewear.

KEEP OUT OF REACH OF CHILDREN

CAUTION/PRECAUCIÓN

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.)

FIRST AID

If swallowed	<ul style="list-style-type: none">• 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 a poison control center or doctor.• Do not give anything by mouth to an unconscious person.
If in eyes	<ul style="list-style-type: none">• 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 or clothing	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Move person to fresh air.• If person is not breathing, call 911 or an ambulance; then give artificial respiration, preferably mouth-to-mouth, if possible.• Call a poison control center or doctor for further treatment advice.

HOTLINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. In case of emergency endangering health or the environment involving this product, call **INFOTRAC** at **1-800-535-5053**.

ENVIRONMENTAL HAZARDS

Do not apply to water except as specified on the label. Do not contaminate water outside the intended treatment area by disposal of equipment washwaters. Do not apply in tidewater/brackish water. Lowest rates should be used in shallow areas where the water depth is considerably less than the average depth of the entire treatment site, for example, shallow shoreline areas. Trees and shrubs growing in water treated with SonarOne herbicide may occasionally develop chlorosis. Follow use directions carefully so as to minimize adverse effects on non-target organisms.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

Read all *Directions for Use* carefully before applying.

PRODUCT INFORMATION

SonarOne herbicide is a selective systemic aquatic herbicide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs, drainage canals, irrigation canals, and rivers. SonarOne is a pelleted formulation containing 5% fluridone. SonarOne is absorbed from water by plant shoots and from hydrosol by the roots of aquatic vascular plants. It is important to maintain SonarOne in contact with the target plants for as long as possible. Rapid water movement or any condition which results in rapid dilution of SonarOne in treated water will reduce its effectiveness. In susceptible plants, SonarOne inhibits the formation of carotene. In the absence of carotene, chlorophyll is rapidly degraded by sunlight.

Herbicidal symptoms of SonarOne appear in 7 - 10 days and appear as white (chlorotic) or pink growing points. Under optimum conditions 30 - 90 days are required before the desired level of aquatic weed management is achieved with SonarOne. Species susceptibility to SonarOne may vary depending on time of year, stage of growth and water movement. For best results, apply SonarOne prior to initiation of weed growth or when weeds begin active growth. Application to mature target plants may require an application rate at the higher end of the specified rate range and may take longer to control.

SonarOne is not corrosive to application equipment.

This label provides recommendations on the use of a chemical analysis for the active ingredient. SePRO Corporation recommends the use of High-Performance Liquid Chromatography (HPLC) for the determination of the active ingredient concentration in the water. Contact SePRO Corporation to incorporate this test, known as a FastEST, into your treatment program. Other proven chemical analyses for the active ingredient may also be used. The FastEST is referenced in this label as the preferred method for the rapid determination of the concentration of the active ingredient in the water.

Application rates are provided in pounds of SonarOne to achieve a desired concentration of the active ingredient in part per billion (ppb). **The maximum application rate or sum of all application rates is 90 ppb in ponds and 150 ppb in lakes and reservoirs per annual growth cycle.** This maximum concentration is the amount of product calculated as the target application rate, NOT determined by testing the concentrations of the active ingredient in the treated water.

Use Precautions and Restrictions

- **Obtain Required Permits:** Consult with appropriate state or local water authorities before applying this product to public waters. Permits and/or posting treatment notification may be required by state or local public agencies.
- **New York State:** Application of SonarOne is not permitted in waters less than two (2) feet deep, except as permitted under FIFRA Section 24(c), Special Local Need registration.
- **Hydroponic Farming:** Do not use SonarOne treated water for hydroponic farming unless a FastEST has been run and confirmed that concentrations are less than 1 ppb.
- **Greenhouse and Nursery Plants:** Consult with SePRO Corporation for site-specific recommendations prior to any use of SonarOne treated water for irrigating greenhouse or nursery plants. Without site-specific guidance from SePRO, do not use SonarOne treated water for irrigating greenhouse or nursery plants unless a FastEST has been run and confirmed that concentrations are less than 1 ppb.

• **Water Use Restrictions Following Application with SonarOne (Days)**

Application Rate	Drinking†	Fishing	Swimming	Livestock/Pet Consumption	Irrigation††
Maximum Rate (150 ppb) or less	0	0	0	0	See irrigation instructions below

† Note below, under Potable Water Intakes, the information for application of SonarOne within ¼ miles (1,320) feet of a functioning potable water intake.

†† Note below, under Irrigation, specific time frames or fluridone concentrations that provide the widest safety margin for irrigating with fluridone treated water.

- **Potable Water Intakes:** Concentrations of the active ingredient fluridone up to 150 ppb are allowed in potable water sources; however, in lakes and reservoirs or other sources of potable water, do not apply SonarOne at application rates greater than 20 ppb within one-fourth (1/4) mile (1,320 feet) of any functioning potable water intake. At application rates of 8-20 ppb, SonarOne may be applied within ¼ mile where functioning potable water intakes are present. **NOTE: Existing potable water intakes which are no longer in use, such as those replaced by connections to potable water wells or a municipal water system, are not considered to be functioning potable water intakes.**
- **Irrigation:** Irrigation with SonarOne treated water may result in injury to the irrigated vegetation. Follow these precautions and inform those who irrigate from areas treated with SonarOne of the irrigation time frames or water FasTEST requirements presented in the table below. Follow the following time frames and FasTEST directions to reduce the potential for injury to vegetation irrigated with water treated with SonarOne. Greater potential for crop injury occurs where SonarOne treated water is applied to crops grown on low organic and sandy soils.

Application Site	Days After Application		
	Established Tree Crops	Established Row Crops/Turf/Plants	Newly Seeded Crops/Seedbeds or Areas to be Planted Including Overseeded Golf Course Greens
Ponds and Static Canals †	7	30	FasTEST required
Canals	7	7	FasTEST required
Rivers	7	7	FasTEST required
Lakes and Reservoirs ††	7	7	FasTEST required

† For purposes of SonarOne labeling, a pond is defined as a body of water 10 acres or less in size. A lake or reservoir is greater than 10 acres.

†† In lakes and reservoirs where one-half or greater of the body of water is treated, use the pond and static canal irrigation precautions.

Where the use of SonarOne treated water is desired for irrigating crops prior to the time frames established above, use the FasTEST to measure the concentration in the treated water. Where a FasTEST has determined that concentrations are less than 10 parts per billion, there are no irrigation precautions for irrigating established tree crops, established row crops or turf. **For tobacco, tomatoes, peppers or other plants within the Solanaceae family and newly seeded crops or newly seeded grasses such as overseeded golf course greens, do not use SonarOne treated water if concentrations are greater than 5 ppb; furthermore, when rotating crops, do not plant members of the Solanaceae family in land that has been previously irrigated with fluridone concentrations in excess of 5 ppb. It is recommended that a SePRO Aquatic Specialist be consulted prior to commencing irrigation of these sites.**

PLANT CONTROL INFORMATION

SonarOne selectivity is dependent upon dosage, time of year, stage of growth, method of application, and water movement. The following categories: controlled, partially controlled, and not controlled, are provided to describe expected efficacy under ideal treatment conditions using higher to maximum label rates. Use of lower rates will increase selectivity of some species listed as controlled or partially controlled. Additional aquatic plants may be controlled, partially controlled, or tolerant to SonarOne. It is recommended to consult a SePRO Aquatic Specialist prior to application of SonarOne to determine a plant's susceptibility to SonarOne. **NOTE: algae (chara, nitella, and filamentous species) are not controlled by SonarOne.**

Vascular Aquatic Plants Controlled By SonarOne: 1

Submersed Plants:

- bladderwort (*Utricularia* spp.)
- common coontail (*Ceratophyllum demersum*) †
- common Elodea (*Elodea canadensis*) †
- egeria, Brazilian Elodea (*Egeria densa*)
- fanwort, Cabomba (*Cabomba caroliniana*)
- hydrilla (*Hydrilla verticillata*)
- naiad (*Najas* spp.) †
- pondweed (*Potamogeton* spp., except Illinois pondweed) †
- watermilfoil (*Myriophyllum* spp. except variable-leaf milfoil)

Floating Plants:

- salvinia (*Salvinia* spp.)
- duckweed (*Lemna*†, *Spirodela*†, and *Landoltia* spp.)
- mosquito fern (*Azolla caroliniana*) †

Shoreline Grasses:

- paragrass (*Urochloa mutica*)

1 Species denoted by a dagger (†) are native plants that are often tolerant to fluridone at lower use rates. Please consult a SePRO Aquatic Specialist for recommended SonarOne use rates (not to exceed maximum labeled rates) when selective control of exotic species is desired.

Vascular Aquatic Plants Partially Controlled By SonarOne:

Submersed Plants:

- Illinois pondweed (*Potamogeton illinoensis*)
- limnophila (*Limnophila sessiliflora*)
- tapegrass, American eelgrass (*Vallisneria americana*)
- watermilfoil--variable-leaf (*Myriophyllum heterophyllum*)

Emerald Plants:

- alligatorweed (*Alternanthera philoxeroides*)
- American lotus (*Nelumbo lutea*)
- cattail (*Typha* spp.)
- creeping waterprimrose (*Ludwigia peploides*)
- parrotfeather (*Myriophyllum aquaticum*)
- smartweed (*Polygonum* spp.)
- spatterdock (*Nuphar luteum*)
- spikerush (*Eleocharis* spp.)
- waterlily (*Nymphaea* spp.)
- waterpurslane (*Ludwigia palustris*)
- watershield (*Brasenia schreberi*)

Shoreline Grasses:

- barnyardgrass (*Echinochloa crusgalli*)
- giant cutgrass (*Zizaniopsis miliacea*)
- reed canarygrass (*Phalaris arundinaceae*)
- southern watergrass (*Hydrochloa caroliniensis*)
- torpedograss (*Panicum repens*)

Vascular Aquatic Plants Not Controlled By SonarOne:

Emerald Plants:

- American frogbit (*Limnobium spongia*)
- arrowhead (*Sagittaria* spp.)
- bacopa (*Bacopa* spp.)
- big floatingheart, banana lily (*Nymphoides aquatica*)
- bulrush (*Scirpus* spp.)
- pickerelweed, lanceleaf (*Pontederia* spp.)
- rush (*Juncus* spp.)
- water pennywort (*Hydrocotyle* spp.)

Floating Plants:

floating waterhyacinth (*Eichhornia crassipes*)
waterlettuce (*Pistia stratiotes*)

Shoreline Grasses:

maiden cane (*Panicum hemitomon*)

NOTE: Algae (chara, nitella, and filamentous species) are not controlled by SonarOne.

APPLICATION DIRECTIONS

The aquatic plants present in the treatment site should be identified prior to application to determine their susceptibility to SonarOne. It is important to determine the area (acres) to be treated and the average depth in order to select the proper application rate. Do not exceed the maximum labeled rate for a given treatment site per annual growth cycle.

Application to Ponds

SonarOne may be applied to the entire surface area of a pond. For single applications, rates may be selected to provide 30 - 90 ppb to the treated water, although actual concentrations in treated water may be substantially lower at any point in time due to the slow-release formulation of this product. When treating for optimum selective control, lower rates may be applied for sensitive target species. Use the higher rate within the rate range where there is a dense weed mass, when treating more difficult to control species, and for ponds less than 5 acres in size with an average depth less than 4 feet. Application rates necessary to obtain these concentrations in treated water are shown in the following table. For additional application rate calculations, refer to the *Application Rate Calculation—Ponds, Lakes and Reservoirs* section of this label. Split or multiple applications may be used where dilution of treated water is anticipated; however, the sum of all applications should total 30 - 90 ppb and must not exceed a total of 90 ppb per annual growth cycle.

Average Water Depth of Treatment Site (feet)	Pounds of SonarOne per Treated Surface Acre	
	45 ppb	90 ppb
1	2.5	5.0
2	5.0	10.0
3	7.5	15.0
4	10.0	20.0
5	12.5	25.0
6	15.0	30.0
7	17.0	34.0
8	19.5	39.0
9	22.0	44.0
10	24.5	49.0

Application to Lakes and Reservoirs

The following treatments may be used for treating both whole lakes or reservoirs and partial areas of lakes or reservoirs (bays, etc.). For best results in treating partial lakes and reservoirs, SonarOne treatment areas should be a minimum of 5 acres in size. Treatment of areas smaller than 5 acres or treatment of narrow strips such as boat lanes or shorelines may not produce satisfactory results due to dilution by untreated water. Rate ranges are provided as a guide to include a wide range of environmental factors, such as target species, plant susceptibility, selectivity and other aquatic plant management objectives. Application rates and methods should be selected to meet the specific lake/reservoir aquatic plant management goals.

NOTE: In treating lakes or reservoirs that contain potable water intakes and where the application requires treating within one-fourth (1/4) mile of a potable water intake, no single application can exceed 20 ppb. Additionally, the sum of all applications cannot exceed 150 ppb per annual growth cycle.

A. Whole Lake or Reservoir Treatments (Limited or No Water Discharge)

Single Application to Whole Lakes or Reservoirs

Where single applications to whole lakes or reservoirs are desired, apply SonarOne at an application rate of 16 - 90 ppb. Application

rates necessary to obtain these concentrations in treated water are shown in the following table. For additional application rate calculations, refer to the *Application Rate Calculation—Ponds, Lakes and Reservoirs* section of this label. Choose an application rate from the table below to meet the aquatic plant management objective.

Where greater plant selectivity is desired such as when controlling Eurasian watermilfoil and curlyleaf pondweed, choose an application rate lower in the rate range. For other plant species, SePRO recommends contacting a SePRO Aquatic Specialist in determining when to choose application rates lower in the rate range to meet specific plant management goals. Use the higher rate within the rate range where there is a dense weed mass or when treating more difficult to control plant species or in the event of a heavy rainfall event where dilution has occurred. In these cases, a second application or more may be required; however, the sum of all applications cannot exceed 150 ppb per annual growth cycle. Refer to the section of this label entitled, *Split or Multiple Applications to Whole Lakes or Reservoirs*, for guidelines and maximum rate allowed.

Average Water Depth of Treatment Site (feet)	Pounds of SonarOne Per Treated Surface Acre	
	16 ppb	90 ppb
1	0.9	5.0
2	1.7	10.0
3	2.6	15.0
4	3.5	20.0
5	4.3	25.0
6	5.2	30.0
7	6.0	34.0
8	6.9	39.0
9	7.8	44.0
10	8.6	49.0
11	9.5	54.0
12	10.4	59.0
13	11.2	64.0
14	12.1	68.0
15	13.0	73.0
16	13.8	78.0
17	14.7	83.0
18	15.6	88.0
19	16.4	93.0
20	17.3	98.0

Split or Multiple Applications to Whole Lakes or Reservoirs

To meet certain plant management objectives, split or multiple applications may be desired in making whole lake treatments. Split or multiple application programs are desirable when the objective is to use the minimum effective dose and to maintain this lower dose for the sufficient time to ensure efficacy and enhance selectivity. Under these situations, use the lower rates (16 - 75 ppb) within the rate range. **In controlling Eurasian watermilfoil and curlyleaf pondweed and where greater plant selectivity is desired, choose an application rate lower in the rate range.** For other plant species, SePRO recommends contacting a SePRO Aquatic Specialist in determining when to choose application rates lower in the rate range to meet specific plant management goals. For split or repeated applications, the sum of all applications must not exceed 150 ppb per annual growth cycle.

B. Partial Lake or Reservoir Treatments

Where dilution of SonarOne with untreated water is anticipated, such as in partial lake or reservoir treatments, split or multiple applications may be used to extend the contact time to the target plants. The application rate and use frequency of SonarOne in a partial lake is highly dependent upon the treatment area. An application rate at the higher end of the specified rate range may be required and frequency of applications will vary depending upon the potential of untreated

water diluting the SonarOne concentration in the treatment area. Use a rate at the higher end of the rate range where greater dilution with untreated water is anticipated.

Application Sites Greater Than ¼ Mile from a Functioning Potable Water Intake

For single applications, apply SonarOne at application rates from 45 - 150 ppb. Split or multiple applications may be made; however, the sum of all applications cannot exceed 150 ppb per annual growth cycle. Split applications should be conducted to maintain a sufficient concentration in the target area for a period of 45 days or longer. The use of a FasTEST is recommended to maintain the desired concentration in the target area over time.

Application Sites within ¼ Mile of a Functioning Potable Water Intake

In treatment areas that are within ¼ mile of a potable water intake, no single application can exceed 20 ppb. When utilizing split or repeated applications of SonarOne for sites which contain a potable water intake, a FasTEST is required to determine the actual concentration in the water. Additionally, the sum of all applications cannot exceed 150 ppb per annual growth cycle.

Application Rate Calculation — Ponds, Lakes and Reservoirs

The amount of SonarOne to be applied to provide the desired ppb concentration of active ingredient equivalents in treated water may be calculated as follows:

$$\begin{aligned} &\text{Pounds of SonarOne required per treated acre} = \\ &\quad \text{Avg. water depth of treatment site} \times \\ &\quad \text{Desired ppb concentration of active ingredient equivalents} \times 0.054 \end{aligned}$$

For example: the pounds per acre of SonarOne required to provide a concentration of 25 ppb of active ingredient equivalents in water with an average depth of 5 feet is calculated as follows:

$$5 \times 25 \times 0.054 = 6.75 \text{ pounds per treated surface acre.}$$

NOTE: Calculated rates may not exceed the maximum allowable rate in pounds per treated surface acre for the water depth listed in the application rate table for the site to be treated.

Application to Drainage Canals, Irrigation Canals and Rivers

Static Canals

In static drainage and irrigation canals, apply SonarOne at the rate of 20 - 40 pounds per surface acre.

Moving Water Canals and Rivers

The performance of SonarOne will be enhanced by restricting or reducing water flow. In slow moving bodies of water use an application technique that maintains a concentration of 10 - 40 ppb in the applied area for a minimum of 45 days. SonarOne can be applied by split or multiple broadcast applications or by metering in the product to provide a uniform concentration of the herbicide based upon the flow pattern. The use of a FasTEST is recommended to maintain the desired concentration in the target area over time.

Static or Moving Water Canals or Rivers Containing a Functioning Potable Water Intake

In treating a static or moving water canal or river which contains a functioning potable water intake, applications of SonarOne greater than 20 ppb must be made more than ¼ mile from a functioning potable water intake. Applications less than 20 ppb may be applied within ¼ mile from a functioning potable water intake; however, if applications of SonarOne are made within ¼ mile from a functioning water intake, a FasTEST must be utilized to demonstrate that concentrations do not exceed 150 ppb at the potable water intake.

Application Rate Calculation — Drainage Canals, Irrigation Canals and Rivers

The amount of SonarOne to be applied through a metering system to provide the desired ppb concentration of active ingredient in treated water may be calculated as follows:

1. Average flow rate (ft. per second) \times average width (ft.) \times average depth (ft.) \times 0.9 = CFS (cubic feet per second)
2. CFS \times 1.98 = acre feet per day (water movement)
3. Acre feet per day \times desired ppb \times 0.054 = pounds SonarOne required per day.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store in original container only. Do not store near feed or foodstuffs. In case of leak or spill, contain material and dispose as waste.

Pesticide Disposal: Wastes resulting from use of this product may be used according to label directions or disposed of at an approved waste disposal facility.

Container Handling

Nonrefillable Container. DO NOT reuse or refill this container.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

Triple rinse containers small enough to shake (capacity \leq 50

pounds) as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Triple rinse containers too large to shake (capacity $>$ 50 pounds)

as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container ¼ full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or mix tank. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable Container. Refill this container with pesticide only. **DO NOT** reuse this container for any other purpose. Triple rinsing the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller.

Triple rinse as follows: To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

When this container is empty, replace the cap and seal all openings that have been opened during use; return the container to the point of purchase or to a designated location. This container must only be refilled with a pesticide product. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn-out threads and closure devices. Check for leaks after refilling and before transport. **DO NOT** transport if this container is damaged or leaking. If the container is damaged, or leaking, or obsolete and not returned to the point of purchase or to a designated location, triple rinse emptied container and offer for recycling, if available, or dispose of container in compliance with state and local regulations.

TERMS AND CONDITIONS OF USE

If terms of the following *Warranty Disclaimer*, *Inherent Risks of Use* and *Limitation of Remedies* are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, to the extent consistent with applicable law, use by the buyer or any other user constitutes acceptance of the terms under *Warranty Disclaimer*, *Inherent Risks of Use*, and *Limitation of Remedies*.

WARRANTY DISCLAIMER

SePRO Corporation warrants that the product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, SEPRO CORPORATION MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

INHERENT RISKS OF USE

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of SePRO Corporation or the seller. To the extent consistent with applicable law, all such risks shall be assumed by buyer.

LIMITATION OF REMEDIES

To the extent consistent with applicable law, the exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories) shall be limited to, at SePRO Corporation's election, one of the following:

- (1) Refund of purchase price paid by buyer or user for product bought, or
- (2) Replacement of amount of product used.

To the extent consistent with applicable law, SePRO Corporation shall not be liable for losses or damages resulting from handling or use of this product unless SePRO Corporation is promptly notified of such losses or damages in writing. In no case shall SePRO Corporation be liable for consequential or incidental damages or losses.

The terms of the *Warranty Disclaimer*, *Inherent Risks of Use* and this *Limitation of Remedies* cannot be varied by any written or verbal statements or agreements. No employee or sales agent of SePRO Corporation or the seller is authorized to vary or exceed the terms of the *Warranty Disclaimer* or this *Limitation of Remedies* in any manner.

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SePRO Corporation
11550 North Meridian Street, Suite 600
Carmel, IN 46032, U.S.A.

Material Safety Data Sheet



SonarOne Aquatic Herbicide

1. Product and company identification

Product name	: SonarOne Aquatic Herbicide
EPA Registration Number	: 67690-45
Material uses	: Aquatic herbicide.
Supplier/Manufacturer	: SePRO Corporation 11550 North Meridian Street Suite 600 Carmel, IN 46032 U.S.A. Tel: 317-580-8282 Toll free: 1-800-419-7779 Fax: 317-428-4577 Monday - Friday, 8am to 5pm E.S.T. www.sepro.com
Responsible name	: Atrion Regulatory Services, Inc.
In case of emergency	: INFOTRAC - 24-hour service 1-800-535-5053

2. Hazards identification

Physical state	: Solid. [Pellets.]
Odor	: Faint earthy/musty.
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview	: WARNING! HARMFUL IF ABSORBED THROUGH SKIN. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. Harmful if absorbed through the skin. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure. Wash thoroughly after handling.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects	
Inhalation	: Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Ingestion	: No known significant effects or critical hazards.
Skin	: Toxic in contact with skin.
Eyes	: No known significant effects or critical hazards.
Potential chronic health effects	
Chronic effects	: No known significant effects or critical hazards.
Carcinogenicity	: Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Over-exposure signs/symptoms	
Inhalation	: No specific data.
Ingestion	: No specific data.
Skin	: No specific data.
Eyes	: No specific data.
Medical conditions aggravated by over-exposure	: None known.

See toxicological information (section 11)

3 . Composition/information on ingredients

United States		
Name	CAS number	%
4(1h)-pyridinone, 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-	59756-60-4	10 - 30
Silica, Crystalline - Quartz	14808-60-7	0.1 - 1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First aid measures

- Eye contact** : Check for and remove any contact lenses. In case of contact with eyes, rinse immediately with plenty of water. Get medical attention.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 20 minutes. Get medical attention.
- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. Get medical attention.
- Ingestion** : Do not induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5 . Fire-fighting measures

- Flammability of the product** : Non-flammable.
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
halogenated compounds
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

- Large spill** : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

	United States
Product name	Exposure limits
Silica, Crystalline - Quartz	<p>ACGIH TLV (United States, 1/2007). TWA: 0.025 mg/m³ 8 hour(s). Form: Respirable fraction</p> <p>NIOSH REL (United States, 12/2001). TWA: 0.05 mg/m³ 10 hour(s).</p> <p>OSHA PEL Z3 (United States, 9/2005). TWA: 10 mg/m³ 8 hour(s). Form: Respirable</p> <p>OSHA PEL 1989 (United States, 3/1989). TWA: 0.1 mg/m³, (as quartz) 8 hour(s). Form: Respirable dust</p>

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. **Applicators should refer to the product label for personal protective clothing and equipment.**
- Engineering measures** : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Personal protection**
- Eyes** : Safety glasses.
- Skin** : Lab coat.
- Respiratory** : A respirator is not needed under normal and intended conditions of product use.
- Hands** : Disposable vinyl gloves.
- Personal protective equipment (Pictograms)** :



- HMIS Code/Personal protective equipment** : A
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

- Physical state** : Solid. [Pellets.]
- Color** : Brown to gray.
- Odor** : Faint earthy/musty.
- pH** : 7.8 [Conc. (% w/w): 31%]
- Relative density** : 64 lbs/cu. Ft.(20C).
- Solubility** : Insoluble; pellets disintegrates in water.

10 . Stability and reactivity

- Stability** : The product is stable.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.
- Conditions to avoid** : Avoid exposure - obtain special instructions before use.
- Materials to avoid** : Reactive or incompatible with the following materials: oxidizing materials.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Species	Dose	Result	Exposure
4(1h)-pyridinone, 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-	Rabbit	>500 mg/kg	LD50 Dermal	-
	Rat	>10 g/kg	LD50 Oral	-

- Inhalation** : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- Ingestion** : No known significant effects or critical hazards.
- Skin** : Toxic in contact with skin.
- Eyes** : No known significant effects or critical hazards.

Carcinogenicity

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Silica, Crystalline - Quart:	A2	2A	-	+	Proven.	-

12 . Ecological information

- Environmental effects** : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Test	Species	Exposure	Result
4(1h)-pyridinone, 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-	-	Daphnia	48 hours	Acute EC50 3.9 mg/L
	-	Daphnia	48 hours	Acute EC50 3.6 mg/l
	-	Fish	96 hours	Acute LC50 4.2 mg/L
	-	Fish	96 hours	Acute LC50 4.5 mg/L
	-	Fish	96 hours	Acute LC50 4.25 mg/L

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

AERG : Not applicable.

Regulatory information

DOT/IMDG/IATA : Not regulated.

15 . Regulatory information

United States

HCS Classification : Toxic material
Carcinogen

U.S. Federal regulations : **United States inventory (TSCA 8b)**: All components are listed or exempted.

SARA 302/304/311/312 extremely hazardous substances : No products were found.

SARA 302/304 emergency planning and notification : No products were found.

SARA 302/304/311/312 hazardous chemicals : No products were found.

SARA 311/312 MSDS distribution - chemical inventory - hazard identification : No products were found.

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: No products were found.

Clean Air Act (CAA) 112 accidental release prevention : No products were found.

Clean Air Act (CAA) 112 regulated flammable substances : No products were found.

Clean Air Act (CAA) 112 regulated toxic substances : No products were found.

State regulations : **Connecticut Carcinogen Reporting** : None of the components are listed.

Connecticut Hazardous Material Survey: None of the components are listed.

Florida substances: None of the components are listed.

Illinois Chemical Safety Act: None of the components are listed.

Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.

Louisiana Reporting: None of the components are listed.

Louisiana Spill: None of the components are listed.

Massachusetts Spill: None of the components are listed.

Massachusetts Substances : None of the components are listed.

Michigan Critical Material: None of the components are listed.

Minnesota Hazardous Substances : None of the components are listed.

New Jersey Hazardous Substances : The following components are listed: Silica, Crystalline - Quartz

New Jersey Spill: None of the components are listed.

New Jersey Toxic Catastrophe Prevention Act : None of the components are listed.

New York Acutely Hazardous Substances : None of the components are listed.

New York Toxic Chemical Release Reporting : None of the components are listed.

Pennsylvania RTK Hazardous Substances : The following components are listed: Silica, Crystalline - Quartz

Rhode Island Hazardous Substances : None of the components are listed.

California Prop. 65 : **WARNING**: This product contains a chemical known to the State of California to cause cancer.

United States inventory (TSCA 8b) : **United States inventory (TSCA 8b)**: All components are listed or exempted.

International regulations

International lists : This product, (and its ingredients) is (are) listed on national inventories, or is (are) exempted from being listed, in Australia (AICS), in Europe (EINECS/ELINCS), in Korea (TCCL), in Japan (METI), in the Philippines (RA6969).

16 . Other information

Label requirements : HARMFUL IF ABSORBED THROUGH SKIN. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.

Hazardous Material Information System (U.S.A.) :

Health	*	2
Fire hazard		0
Physical Hazard		0
Personal protection		A

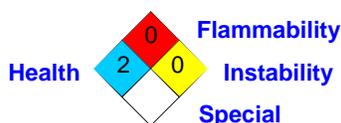
HAZARD RATINGS

- 4- Extreme
- 3- Serious
- 2- Moderate
- 1- Slight
- 0- Minimal

See section 8 for more detailed information on personal protection.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.) :



References : ANSI Z400.1, MSDS Standard, 2004. - Manufacturer's Material Safety Data Sheet. - 29CFR Part1910.1200 OSHA MSDS Requirements. - 49CFR Table List of Hazardous Materials, UN#, Proper Shipping Names, PG.

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Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. The data in this MSDS relates only to the specific material designated herein. Possible adverse effects (see Section 2, 11 and 12) may occur if this material is not handled in the recommended manner.