Turf Product Guide

May 2020

ABOUT KALO

Since 1932, we at KALO have operated under a simple philosophy, put our customers first, help them perform at the top of their game, and take a common sense approach to business.

It's just common sense.

At KALO, we take best-in-class science, and make it better. We maximize every molecule to bring affordable and safe products to market that help turf managers and growers work more efficiently, so they get a higher return on their investments, so they get more from every dollar.

In the turf industry, we help golf course superintendents, lawn care professionals and homeowners squeeze every drop of performance from precious water. An early developer of water management products for highly maintained turf, our wetting agents are proven to keep moisture where it's needed, in the root zone. For decades, we've provided our turf managers with common sense solutions for creating healthy and beautiful greens, fairways, sports turf and lawns, while saving on irrigation and being kinder to the environment.

In agriculture, we provide our customers with common sense solutions for creating healthy crops and bountiful yields, while saving on irrigation, and being kinder to the environment. We offer an extensive line of crop protection products to help our customers get the most from their inputs.

Look to KALO for solutions. We provide innovative technical support encompassing formulation development, packaging, label design, shipping and order fulfillment operations.

If you're a grower or turf manager, it's common sense to protect your investment with tools that let you work safely and efficiently, that conserve resources and are affordable. That's the science behind what we do every day at KALO.

KALO

Since 1932, KALO has been helping growers and turf managers operate more efficiently.

The information used in this product guide is thought to be reliable. Consult plant control and adjuvant product labels to confirm use recommendations.

ALWAYS READ AND FOLLOW ALL DIRECTIONS ON THE PRODUCT LABEL AND THE LABEL OF THE PESTICIDE BEING USED.

CONTENTS

● ...CDPR Registered
◆ ...WSDA Registered
✳ ...CPDA Certified
⊙ ...CDFA Approved
✇ ...Contains Quantum Technology
➢ ...Approved for use with Engenia®
✚ ...Approved for use with Enlist One®
☼ ...Approved for use with Enlist Duo®
✘ ...Approved for use with FeXapan®
◇ ...Approved for use with XtendiMax®

The Properties of Water

Researchers confirm that as much as 60% of natural rainfall can be lost to run-off and evaporation. In addition, water repellency conditions that naturally exist in many soils affect availability of subsurface water.

Water movement problems and the inconsistent distribution of water can bring about challenges for turf professionals.

PHYSICAL CHARACTERISTICS OF WATER

Water naturally exhibits a range of physical properties that work against its even distribution in the soil profile. Although water is electronically neutral (nonionic), the geometric structure of water molecules causes it to be susceptible to hydrogen bonding.

Hydrogen bonding occurs when positively charged regions of water's hydrogen molecules become attached to negatively charged molecules of a solid surface. This aspect of water's molecular structure will affect its behavior when moving through the soil and coming into contact with negatively or positively charged soil surfaces.

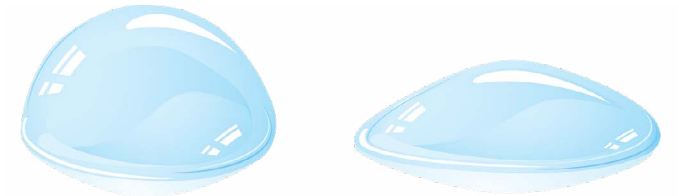
SURFACE TENSION

Surface tension is a description of the energy used by water to cling to itself and its reaction to surrounding air (liquid-air interface). This naturally occurring energy is rated in dynes per centimeter.

Untreated water is rated at 72 dynes/cm. Untreated water droplets will exhibit a high droplet profile, a limited area for the droplet to spread and will roll away from oily surfaces rather than penetrate such surfaces.

Wetting agents used at label rates will typically reduce water's energy to ratings below 30 dynes/cm and many times allow water penetration into repellent surfaces.

For comparison, a droplet of vegetable oil will have a low droplet profile with a greater surface area and will show a likely ability to penetrate oily surfaces. Oil exhibits a much lower surface tension than untreated water, 40 dynes/cm or less.

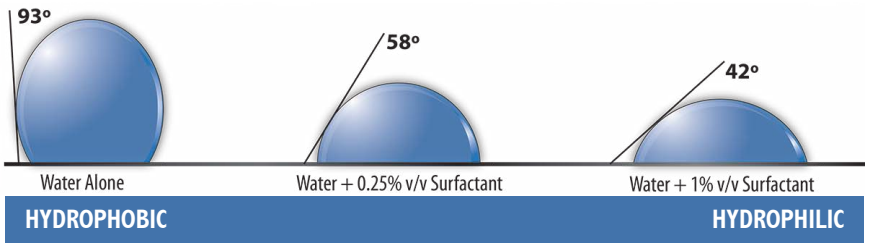


CONTACT ANGLES

As long as a droplet has high surface tension, the water droplet will remain upright and not spread over the leaf.

Such droplets have a high contact angle, which means the droplet covers less surface area. A lower contact angle means the droplet covers more surface area.

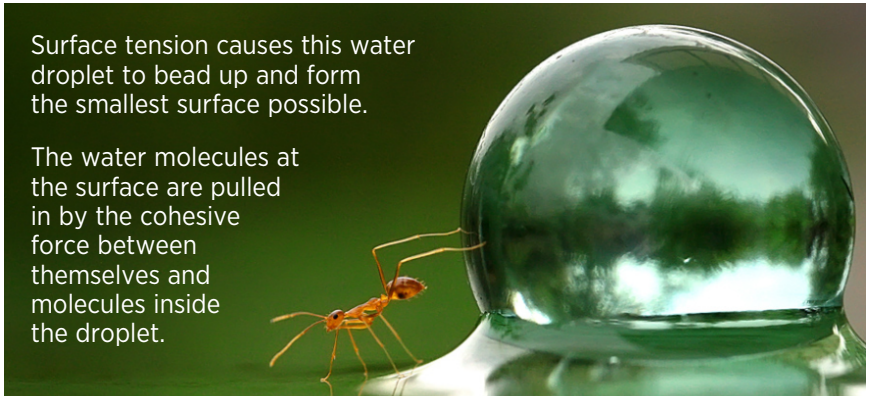
CONTACT ANGLES



COHESIVE TENSION

Cohesive tension plays a major role in determining the amount of water that is attached to surfaces and moves through the soil profile. It too is a form of energy that describes the strong attraction to and between other water molecules.

The fluid state of water is the result of water molecules existing in strong association with each other. Channeling of water during run-off is an example of cohesive tension's influence.



ADHESIVE TENSION

Adhesive tension is related to the wetting (hydration) of a soil. When water comes in contact with a solid surface (liquid-solid interface), the attracting forces between the water molecules and the solid surface will determine the attraction of the water for the solid material.

Hydration occurs when waters attraction to the solid surface is stronger than the energy between individual water molecules (cohesion). The result is that water will spread on (adhere) to the solid surface.

HOW SURFACTANTS AND WETTING AGENTS AFFECT SOIL AND WATER

Surfactants/ Wetting Agents

Surfactants/wetting agents are chemical compounds with molecular structure that reduce surface tension in water and increase droplet coverage area.

Wetting agents work to overcome water repellent characteristics of hydrophobic (repellent) soils.

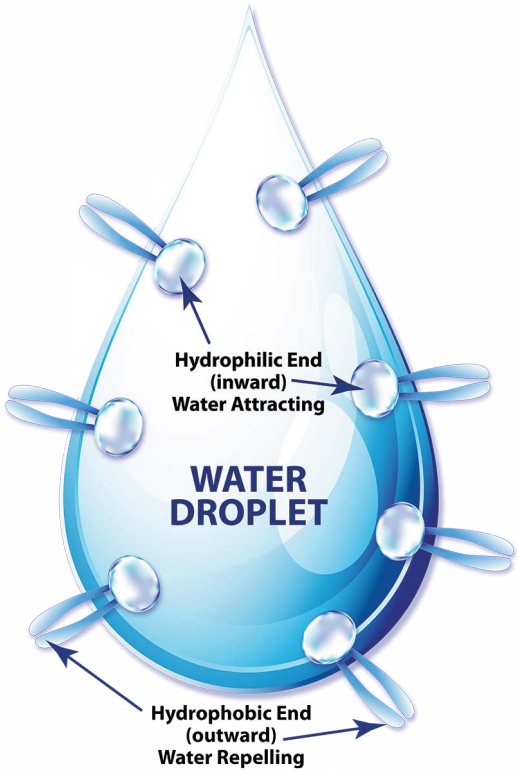
SURFACTANTS IN WATER

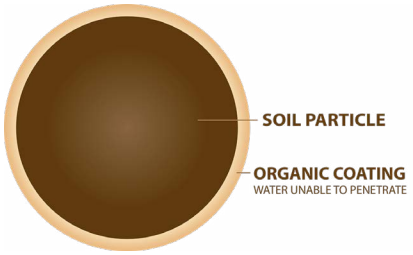
When surfactants are applied to soil with water as the carrier (such as irrigation), the hydrophilic ends (water grabbing ends) of the surfactant molecules are strongly attracted to other molecules, while the hydrophobic ends (water repellent ends) are forced outward. Surface tension is reduced as water molecules "push" outward toward the hydrophil of surfactant.

MODEL OF SURFACTANT MOLECULE

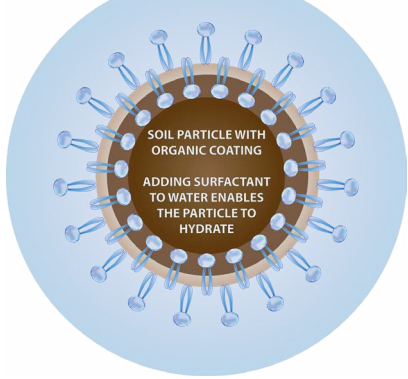
Hydrophilic End Attracts Water (Polar Head)

Hydrophobic End Repels Water (Nonpolar Tail)





BEFORE SOIL SURFACTANT IS ADDED



AFTER SOIL SURFACTANT IS ADDED

SURFACTANTS IN SOIL

When a surfactant is applied to the soil profile, the water repellent (hydrophobic) region of the surfactant attaches to the water repellent site on the soil particle. This serves as an attachment site for water molecules allowing the soil to hydrate.

HYDROPHOBICITY OCCURS AT THE SURFACE LEVEL

Hydrophobicity (repellency) occurs at the surface level. The degree of water repellency may vary, but soil hydrophobicity tends to be a surface problem. In most cases, it is found in the top three inches of soil. As depth increases, water repellency decreases.

LOCALIZED DRY SPOT

Organic coatings that surround sandy soil particles create a water-repellent surface below the rootzone. Researchers generally agree that these organic coatings are the result of decomposing plant materials, microbial deposits, organic acids and fungal substance. These coatings cause irregular shaped water-repellent soil areas. Water that is treated with a wetting agent modifies the water attracting (hydrophilic) and oil attracting (lipophilic) molecules of water in such a manner as to allow water to infiltrate an otherwise water repellent solid surface (soil). This is similar to the way a peat type soil mixture is hard-to-wet once it has been allowed to dry out. Re-wetting dry peat is very difficult due to its natural oil attracting and water repelling characteristics. Wetting agents work as a bridge to link these two divergent substances together.

WETTING AGENTS CAN HELP MOVE WATER

The same principles apply with regard to relieving the various tensions (energies) in water. If standing water has a place to move, then wetting agents will assist its movement. Sand bunkers can likely be drained quicker with wetting agent use. If soils are totally saturated, standing water will likely not be affected by wetting agents.

A WETTING AGENT CAN IMPROVE TURF QUALITY

Wetting agents, or soil surfactants, merely alter the property of water with no impact upon soil structure beyond the enhancement of soil moisture content. Most golf course research data reflect treated vs. untreated soil moisture content to determine efficacy. Visual turf quality ratings are also used and generally go hand in hand with improved moisture resulting in improved turf quality.

Determining Water Quality

Spray solutions commonly contain 95% water or more. Water is the most common liquid used to dilute plant protection products and deliver them to the target pests that they are intended to control, yet we often fail to consider and understand water quality and what it can do to impact the performance of plant protection products.

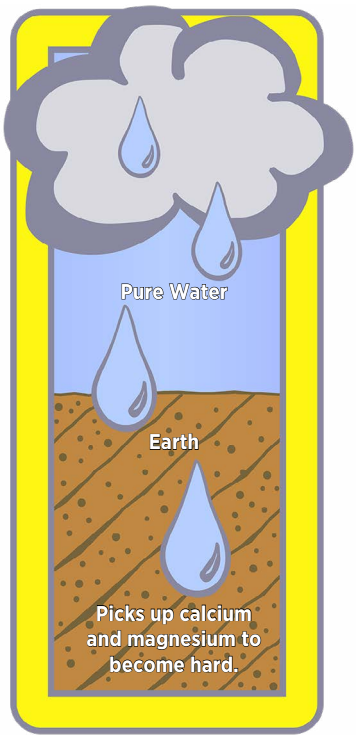
WATER QUALITY

With years of R&D and substantial costs going into the development of plant protection products, performance can be dramatically altered if the water used in the spray operation is not of good quality and suitability for applications. Two water quality variables can quickly impact the activity of many plant protection products; water hardness or dissolved minerals, and water pH (acidity & alkalinity).

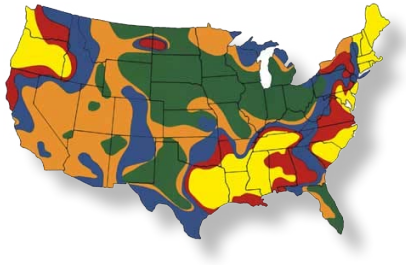
WATER HARDNESS

Almost all natural water sources contain some level of naturally occurring minerals. The minerals and other impurities in water impact spray water pH and overall spray water quality. Generally, the higher levels of mineral make the water harder, reducing spray water quality.

Hard water sources contain higher levels of minerals such as calcium, magnesium, and iron. These minerals impact performance by interacting with the plant protection products antagonizing the ability of the pesticide to perform. Hard water can cause some chemicals to precipitate or fall out of solution. Hard water can also affect the balance of the surfactant system and affect properties such as wetting, emulsification and dispersion.



U.S. Water Hardness Map	
This U.S. map represents average hardness of an area. Your water quality may differ.	
Less Than 3 gpg	Slightly Hard
3 to 7 gpg	Moderately Hard
7 to 10 gpg	Hard
10 to 14 gpg	Very Hard
Over 14 gpg	Extremely Hard

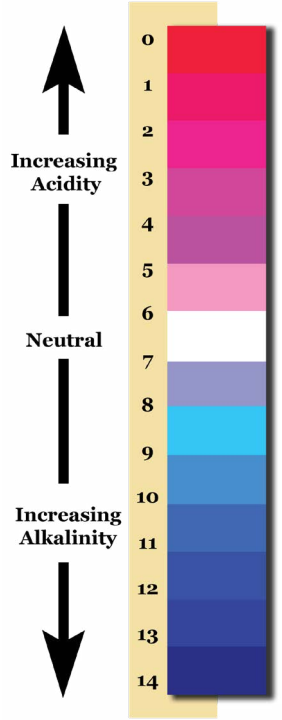


HOW TO MEASURE WATER HARDNESS

Water hardness is measured in parts per million (ppm) or grains per gallon (gpg). A gpg is equivalent to 17.1 ppm. Water is considered hard when it measures 250 ppm or 14.6 gpg. Soft water contains less then 50 ppm (3 gpg) of calcium carbonate.

WATER pH

pH is a measure of acidity and alkalinity scaled on a range between 1 and 14. A pH of 7 is neutral, less than 7 is acidic, and more than 7 alkaline.



WHY pH IS IMPORTANT

It is important to have a general understanding of the spray water's pH and the sensitivity of pesticides to it. A pH of 5.0 to 6.5 (slightly acidic) is optimum for most spray applications. Some pesticides, including insecticides, fungicides, growth regulators and miticides can degrade chemically when subjected to a high pH through a process called alkaline hydrolysis. Both alkaline hydrolysis and acid hydrolysis reduce the effectiveness of the pesticide. The pesticide label will indicate the desired pH range of water in the spray tank.


The use of a water test kit can measure the pH of water.

How Wetting Agents Benefit Turf & Golf Course Management

The common denominator for maintaining the quality of any highly maintained turf is availability of sufficient water where it needs to be in the turf rootzone.

REDUCED COSTS

Next to labor costs, purchasing water from municipal water supplies along with utility costs for operating pump stations account for the highest budget expense at the golf course. Proven wetting agent formulas have been shown to significantly increase soil moisture content and reduce watering rates as they function to enhance water availability and efficiency. Reduced operational costs for golf course irrigation systems can many times pay for the wetting agent cost.

WATERING-IN THE WETTING AGENT

It is always advisable to briefly water-in treated areas to move the product off the leaf surface and into the soil profile where it performs its function. The volume of water carrier that is used in conjunction with the wetting agent can determine the practice of a follow-up watering. Using more water as the carrier for the wetting agent will lessen the requirement for immediate follow-up watering.

TANK MIXING A WETTING AGENT WITH OTHER PLANT PROTECTANT PRODUCTS

There is generally very little, if any, recommendation for this use on wetting agent labels. There are simply too many variables that exist. No wetting agent can be properly tested to account for all the many plant protectant or nutrient products available today. Always rely on the plant protectant or nutrient product label as your guideline. If it is void of information for tank mixing a wetting agent or recommends against such use, then the applicator does so at his own risk.

Conduct compatibility and turf safety tests prior to mixing wetting agents with other products. Apply to small turf areas before determining use. Always consider using reduced rates of the wetting agent if you have determined the compatibility and plant safety in advance.

MINIMIZE OR ELIMINATE TURF BURN AND DISCOLORATION

Not all wetting agent formulas are the same. The active ingredient types and strengths, along with atmospheric conditions, can influence their behavior. Temporary turf burn or discoloration can occur with some wetting agents.

Wetting agent formulas containing a high solvent content can contribute to phytotoxicity if not diluted or sprayed according to label instructions. A wetting agent that is neutral in its electronic charge (nonionic) is preferred to ensure plant safety.

Properly cleaning spray tanks and lines prior to wetting agent use is imperative. Many times a wetting agent tank mix can release trapped active materials that remain in tank walls or lines thereby further "cleaning" an otherwise clean tank. Spray equipment contaminants cause a significant number of reported turf discoloration incidents.

Low dilution rate (less water carrier) wetting agent application during high heat stress periods can also contribute to discoloration, particularly if the spray is allowed to dry on the leaf surface of the plant.

Turf discoloration can be minimized or eliminated with proper spray preparation and planning.

RESIDUAL PERFORMANCE

Most wetting agents, when applied at their maximum label rates, should influence water's behavior immediately and up to 90 days after treatment. Certain variables affect residual performance; formula structure and percent of active ingredient of the wetting agent, soil pH and microbial activity, and/or water or rainfall rates after application.

Some wetting agent manufacturers report several months of residual with their product. Determining a wetting agent's residual performance is subjective outside of university study. Although a variety of wetting agents available today will work similarly in reducing acute water repellency, there are differences among products in terms of the amount of material and number of applications required. There are also considerations involving application timing and use rates. Up to 90 days of extended wetting agent function should be acceptable in most applications.

Wetting agents that offer preventative and in-season curative treatment recommendations provide the greatest use value.

QUANTUM™

Introduction.

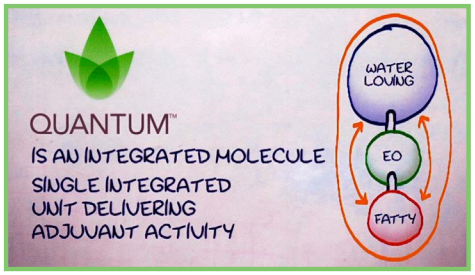
Introducing QUANTUM adjuvant technology for agriculture and turf. This innovative, new adjuvant chemistry will change the way growers, turf managers and golf superintendents manage for efficiency with spray applications. This molecule is the key to the revolution. It's been optimized by scientists to work more efficiently than ordinary adjuvant chemistry. Through its unique molecular structure, by its affinity to pesticides, and by dual action delivery. QUANTUM can serve as a low use-rate replacement for crop oil, methylated seed oil and nonionic surfactants.

Unique molecular structure.

Although it is oil based, chemically bonded QUANTUM contains a triglyceride or fatty compound with ethylene oxide or water attracting compound that is uniquely positioned into the molecule. So QUANTUM is – essentially – an oil derived, self-emulsifying adjuvant with nonionic surfactant characteristics.

Traditional adjuvants have generally been built the same way for a long time. These include crop oils, nonionic surfactants, silicones, stickers, methyl esters and other types. They are usually mixtures of one or more surfactants, sometimes blended in combination with soybean or paraffinic oils.

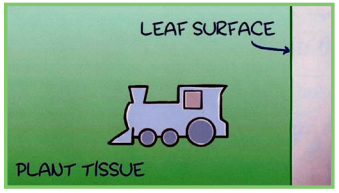
One of the major differences between QUANTUM and traditional adjuvant chemistry is that QUANTUM is an integrated molecule rather than a blend. We've actually taken a vegetable derived fatty substance and embedded it with a water attracting, oxygenated component by bonding the ethylene oxide to the triglyceride. This means that QUANTUM is a single integrated unit that delivers adjuvant activity – not a mixture of surfactants or oils.



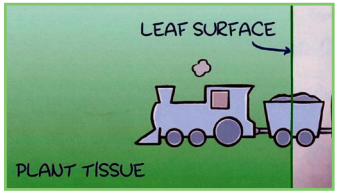
This is a huge advantage because QUANTUM performs in situations that call for a nonionic surfactant or an oil based adjuvant.

Another benefit that QUANTUM provides is a much greater affinity for the pesticide with which it is being mixed. This is due to the unique positioning of the ethylene oxide into the interior of the triglyceride structure. This results in a properly oxygenated molecule that increases the ability of QUANTUM to actually associate with a pesticide.

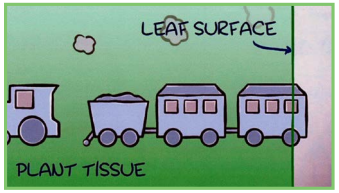
Optimized for its affinity to pesticide.



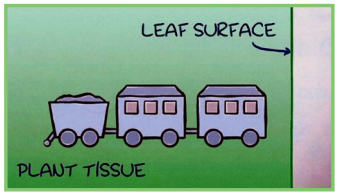
Think of it as sort of the locomotive on the train.



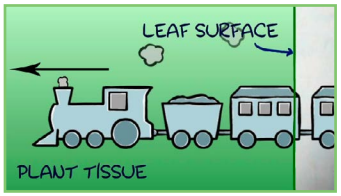
If we have a leaf surface and we're going to use an adjuvant to promote penetration, then it's sort of like a locomotive pulling the rest of the cars along the track.



If, once you get in the plant surface, the locomotive drops the cars and they just sit inside the plant surface,

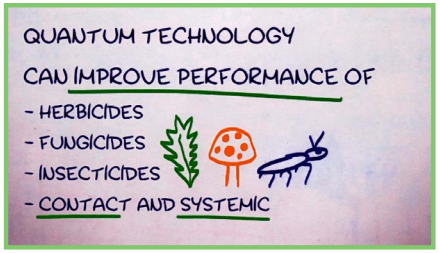


then they've got to find their own way through the plant tissues and to the site of activity.



QUANTUM serves as an escort for the active ingredient into plant tissue.

QUANTUM technology can improve performance of not just herbicides but fungicides and insecticides too. This high performance adjuvant works with both contact and systemic pesticides.



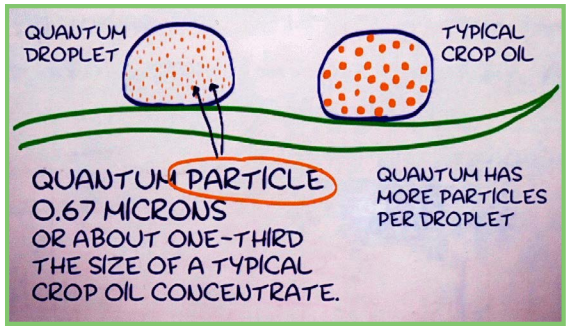
QUANTUM TECHNOLOGY

Even more than that, QUANTUM technology works well across an impressive range of many turf and agrochemical active ingredient types, because it contains both oil and surfactant characteristics in a single molecule.

Dual Action Delivery.

QUANTUM technology is engineered to provide Dual Action Delivery of adjuvant performance in two distinctive ways:

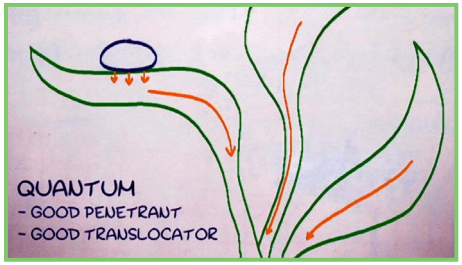
QUANTUM forms a smaller emulsion particle size. And It has a smaller molecular surface area. Let's look at each of these, because they both positively influence the degree of activity of the pesticide on the leaf and in the plant.



QUANTUM technology forms a much, smaller emulsion particle size compared to regular adjuvant chemistry. It is around 0.67 microns, or about one-third the size of a typical crop oil concentrate. So, the fact that the QUANTUM emulsion particle size is much smaller makes a very big difference in its efficiency. And here's the reason why. Each spray droplet contains a higher population of small emulsified particles, with each particle delivering potent adjuvant activity.

As a result, QUANTUM can be used as a reduced rate replacement for standard crop oil concentrates, providing equivalent activity at a fraction of the dose.

Smaller emulsion particle size.



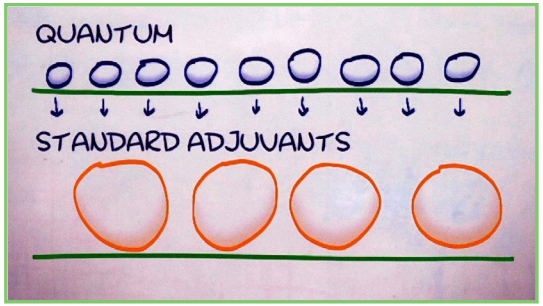
The second aspect of QUANTUM's Dual Action Delivery is the small molecular surface area. What this means is that QUANTUM can densely populate the treated surface with more surfactant molecules than conventional adjuvant technology. This distinctive characteristic is called "molecular packing". And this small molecular size also means better mobility and ease of movement through plant tissue.

QUANTUM is not only a very good penetrating adjuvant, but it's a good translocator as well and will move, once it's in the plant and continue that movement throughout the plant system.

Smaller molecular surface area.

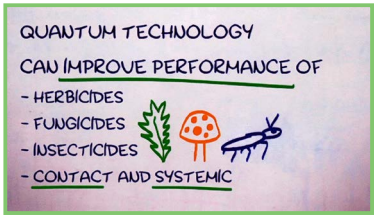
When you think about the importance of a surfactant's emulsion particle size and the size of the molecular surface area, imagine a flat table top as a leaf surface. You can put a lot more ping pong balls on the table than basketballs. That means more points of contact with the target surface.

Because of the smaller emulsion particle size and smaller molecular surface area, QUANTUM can provide a higher population density of surfactant molecules on the treated surface compared to standard adjuvant chemistries. It's because of the unique molecular structure of the QUANTUM technology that we get this optimal surfactant sizing.



In summary.

So, in summary, we have an innovative, new adjuvant technology with a unique molecular structure that has both oil and surfactant properties. This technology has an affinity for pesticide active ingredients with Dual Action Delivery of adjuvant performance that penetrates, translocates and moves through plants quicker and more efficiently. And because QUANTUM is a vegetable-derived adjuvant, it is safe on plants while helping turf and agrochemicals deliver a knock-out blow to weeds, disease or pests.



All of these factors contribute to a very efficient adjuvant technology that is active at low use rates.

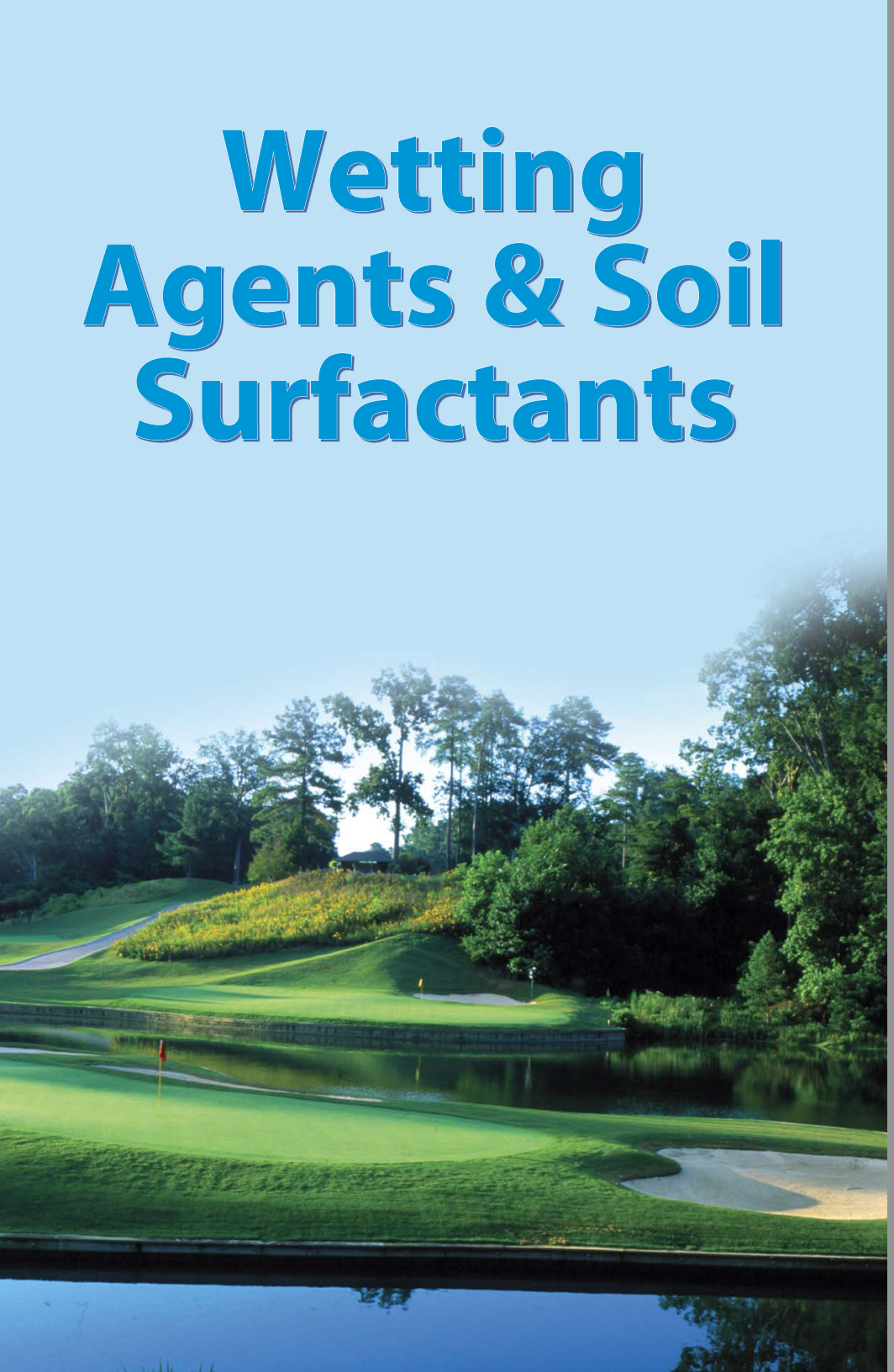
Rates. Functions. Savings. Eco-friendly.

Here's the exciting part. Adjuvants containing QUANTUM technology can be used at rates as low as one-half to one-fourth the rate of some conventional adjuvants and can function as either an oil-based adjuvant or a nonionic surfactant. That represents big savings in stocking, distribution and transportation costs. It means more treated acres per load. And it means improved field performance. And because it is made from plant derived chemistry, QUANTUM has a safer toxicology profile and is readily biodegradable.

QUANTUM–The Innovative Adjuvant Technology.

QUANTUM

Wetting Agents & Soil Surfactants



Gravitate™

HUMECTANT / HYGROSCOPIC / SURFACTANT BLEND

Go with Gravitate to optimize water usage and increase yields.

Gravitate's ingredients maximize plant-available moisture for more efficient use of irrigation water and rainfall.

Gravitate offers the added benefit of capturing soil moisture vapor that otherwise would be lost to evaporation.

When sprayed or injected into the soil, Gravitate forms a subsurface film that attracts and stores moisture as microscopic droplets on plant roots and soil particle surfaces.

Droplets are drawn into the rootzone while Gravitate reamains in place, extracting additional moisture from vapor in the soil matrix.

As a result, gravitate converts any otherwise unavailable soil moisture into usable water droplets, thereby minimizing drought stress between irrigation or rainfall.

NONPLANT FOOD INGREDIENTS

38.0% Humectants
17.1% Alkylpolyglucoside
11.9% Oxirane, Methyl, Polymer with Oxirane
1.6% Castor Oil, Ethoxylated

USE RATES		
For Best Results Inject Through Irrigation Systems:	Apply at an initial rate of 2 quarts per acre	Subsequent applications should be made at the rate of 1 to 2 quarts per acre to meet the needs of the crop, based on environmental conditions
Conventional Sprayers:	Apply at 2 quarts per acre and follow immediately with an irrigation cycle	Apply subsequent applications at 1 to 2 quarts per acre and irrigate immediately

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa
CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING

2 x 2.5 gallon jugs
36 cases per pallet
Item# GRAV02

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with. Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

H2O Maximizer™

SOIL SURFACTANT / POLYMER RESIN BLEND

H2O Maximizer is an innovative blend of surfactants that enhance water infiltration through repellent thatch for more uniform soil moisture.

H2O Maximizer's polymer resin enhances water adsorption to soil particles for increased soil moisture to the plant rootzone.

H2O Maximizer maximizes plant available water. Plant available water is that portion of water holding capacity that can be absorbed by the plant.

Directions For Use		
Use H2O Maximizer in a scheduled water management program throughout the growing season to improve irrigation efficiency resulting in shorter irrigation cycles while maintaining turf quality.		
Turf Spray Applications	10 fl. oz. diluted in 1 to 2 gallons of water per 1,000 square feet	For best results on highly maintained turf such as golf greens or sports fields.
For Irrigation Injection/ Large Area Application	16 to 24 fl. oz. per acre	Inject on a monthly basis throughout the growing season.
For Conventional Tank Mix Spray Applications on Fairways or Commercial Lawns	30 fl. oz. diluted in 40 gallons of water per acre	Reapply monthly or as needed throughout the growing season.
New Seedlings-Stand Establishment	5 to 10 fl. oz. diluted in 3 gallons of water per 1,000 square feet	May be applied in advance, or following a new watering cycle following a new turf seeding to enhance soil moisture and improve water infiltration.
Soil Media Applications	5 fl. oz. diluted in 2 gallons of water applied to 1 cubic yard of media	For enhanced hydration of soil, peat or bark media. Add to water and stir contents.
For Difficult-to-Wet Media	10 fl. oz. diluted in 2 gallons of water applied per cubic yard	Apply as a drench applied cation.

NONPLANT FOOD INGREDIENTS
17.0% Alkylpolyglucoside
9.5% Poloxalene
2.0% Poly (2-propenamide)

H2O MAXIMIZER

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING
2 x 2.5 gallon jugs / 36 cases per pallet
Item# HMAX02

30 gallon drum / 5 drums per pallet
Item# HMAX30

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

H2O Maximizer™ Pellets

SOIL SURFACTANT / POLYMER RESIN BLEND

H20 Maximizer Pellets contain H20 Maximizer liquid formula packaged in a convenient system for supplemental treatment of highly maintained turf areas.

H20 Maximizer has the ability to hold more plant available water due to the polymer resins in the formula.

This makes H20 Maximizer extremely effective for newly seeded and sodded areas, bunker faces or anywhere a turfgrass manager wishes to give the soil more plant available water holding capacity.

H20 Maximizer Pellet will effectively treat localized dry spot in a wide range of soil types and turfgrass varieties.

Use H20 Maximizer Pellet as a part of a comprehensive water management program for curative treatment of localized dry spot.

H20 Maximizer Pellet is formulated for use on golf courses, athletic fields, commercial, and residential turf.

Directions For Use		
For Hose-End Applicator:	Using available commercial in-line hose applicators, remove the plastic lid, insert the H20 Maximizer Pellet and the plastic jar into the reservoir of the hose-end applicator with the opening of the jar containing the pellet facing toward the flow of water. Secure the reservoir to the applicator and begin application.	Inserting the jar with the pellet facing away from the water flow will slow the rate of erosion of the pellet thereby reducing the amount of wetting agent dispersed over time. This is an acceptable option for minimizing wetting agent use.
For Golf Course Greens, Tees and Other Highly Maintained Turf Areas:	Place one pellet into an applicator. Apply 2 to 4 minutes per 1,000 sq. feet (100 sq. meters) of turfgrass.	The rate at which a pellet dissolves varies with water pressure, flow rate and temperature.
Reapply H20 Maximizer Pellet as a curative treatment or follow-up maintenance in conjunction with a regular water management program.		

NONPLANT FOOD INGREDIENTS
14.45% Alkylpolyglucoside
5.35% Poloxalene
0.20% Poly (2-propenamide)
80.00% Binders

H2O MAXIMIZER

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING
30 x 4 ounce pellets
96 cases per pallet
Item# HYPEL

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

WETTING AGENT • SOIL SURFACTANT • WETTING AGENT • SOIL SURFACTANT • WETTING AGENT

Hydro-Wet®

SOIL AND TURF WETTING AGENT

Hydro-Wet is a high performance turf and soil wetting agent formulated to assist the management and conservation of water to ensure uniform movement, distribution and availability of water into the root zone.

Hydro-Wet reduces watering requirements by minimizing water repellency in soils.

Hydro-Wet can be safely applied as a preventative or curative treatment to improve irrigation efficiency and enhance turf quality by controlling localized dry spots in highly maintained turf areas.

NONPLANT FOOD INGREDIENTS
87.5% Polyoxyethylenepoly-propoxypropanol, Glycol Butyl Ether

Directions For Use		
Golf Course Greens and Tees:	As a preventative treatment, apply Hydro-Wet at a rate of 8 fluid ounces diluted in 3 to 5 gallons of water per 1,000 square feet in advance of high heat stress.	After 7 to 14 days following initial application, apply an additional application of 8 fluid ounces per 1,000 square feet diluted in the same manner.
Monthly Maintenance Treatment Schedule:	Can be substituted for the preventative treatment rate as follows: Using dilution rates as indicated above; apply an initial application of 8 fluid ounces per 1,000 square feet followed by monthly applications at a rate of 4 fluid ounces per 1,000 square feet.	
Golf Course Fairways, Athletic Fields and General Turf Areas:	Apply at a rate of 24 to 32 fluid ounces diluted in 40 to 50 gallons of water per acre. Reapply monthly throughout the season.	
Irrigation Injection Monthly Program:	Inject 24 to 32 fluid ounces in 40 to 50 gallons of water per acre per month throughout the growing season.	
Soil Mixes and Lawn Care:	Apply 4 fluid ounces diluted in 5 gallons of water, then apply to 1 cubic yard of soil mixture or each 1,000 square feet of planting area.	
Lawn Care:	2 to 4 fluid ounces diluted in 2 to 3 gallons of water applied per 1,000 square feet Irrigate immediately following application.	

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING
2 x 2.5 gallon jugs / 36 cases per pallet
Item# HY02

30 gallon drums / 5 drums per pallet
Item# HY30

55 gallon drums / 4 drums per pallet
Item# HY55

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Hydro-Wet® Pellets

TURF AND SOIL WETTING AGENT

Hydro-Wet Pellets are designed to supplement regular applications of Hydro-Wet liquid turf wetting agent in reducing the incidence of dry spot on turfgrass.

Hydro-Wet Pellets reduce the surface tension of water and aid infiltration into hydrophobic soils.

Hydro-Wet Pellets must be applied with a hose-end applicator specifically designed to slowly dissolve the pellet into the water flow. They are often referred to as a "Pellet Applicator" or "Drencher."

One Hydro-Wet Pellet will provide approximately 30 minutes of treatment.

Water flow rates, operating pressures, water temperature and spray nozzle design all have an effect upon the rate at which the pellet will dissolve.

It is recommended that a new Hydro-Wet Pellet be added to the applicator after the first has been dissolved to 1/3 its original size.

Thoroughly clean applicator after use.

NONPLANT FOOD INGREDIENTS
50.0% Polyoxyethylenepoly-propoxypropanol, Glycol Butyl Ether

Directions For Use		
To prevent the occurrence of localized dry spots, begin applications at least one month prior to moisture stress.		
Golf Course Greens, Tees and Fine Turf	Place one Hydro-Wet Pellet into an applicator. Apply 2 to 4 minutes per 1,000 square feet of turfgrass.	Treat weekly or as needed.
For In-Season Problems With Localized Dry Spots	Extend the application time to 4 to 8 minutes per 1,000 square feet of turfgrass.	
Note	It is advisable to hand water or irrigate turf area following an application to assist the movement of the active ingredient into the soil profile.	

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING
30 x 4 ounce pellets per case
96 cases per pallet
Item # HYPEL

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

WETTING AGENT • SOIL SURFACTANT • WETTING AGENT • SOIL SURFACTANT • WETTING AGENT

Hydro-Wet® Injectable

NONIONIC SURFACTANT / IRRIGATION INJECTABLE FORMULATION

Hydro-Wet Injectable improves the infiltration and penetration of applied irrigation water onto highly maintained turf areas.

Hydro-Wet Injectable can be used on all types of irrigation injection systems.

Hydro-Wet Injectable is formulated to treat soil repellency and enhance soil moisture content.

Hydro-Wet Injectable can also be applied using conventional ground spray equipment.

NONPLANT FOOD INGREDIENTS
14.0% Poloxyalkylene Glycol

Directions For Use		
Hydro-Wet Injectable should be compatible with most tank mix companion products. Read and follow the label instructions of the accompanying products to ensure that Hydro-Wet Injectable is appropriate for such use. If no recommendations are available for such use, conduct a jar test with all ingredients to confirm compatibility and spray apply mixture to small treatment area to confirm plant safety prior to large scale applications.		
Injection Application	Inject Hydro-Wet Injectable at a rate of 12 to 24 fluid ounces per acre monthly, or as needed throughout the growing season.	
For More Difficult Areas	Hydro-Wet Injectable may be injected up to 48 fluid ounces per acre.	
Conventional Sprayers	Apply 3/4 to 1 fluid ounces, diluted in 1 gallon of water spray, per 1,000 square feet of turf area.	Apply monthly throughout the growing season.
Spray Applications	Add 12 to 24 fluid ounces of Hydro-Wet Injectable per 100 gallons.	

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING
30 gallon drums / 5 drumss per pallet
Item# HYI30

265 gallon tote / 1 tote per pallet
Item# HYI265

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Medalist™

ELIMINATES LOCALIZED DRY SPOT / ENHANCES TURF QUALITY / REDUCES WATERING FREQUENCY

Medalist soil surfactant, when used in a water management program, will distribute water more uniformly through the root zone thereby minimizing localized dry spot, enhancing turf quality and reducing watering frequency.

Medalist can be used with irrigation injection systems. It improves water use efficiency everywhere you irrigate.

Medalist contains ingredients derived in part from renewable resources. This nonionic surfactant provides safe, effective treatment of highly maintained turf when used in accordance with label directions.

NONPLANT FOOD INGREDIENTS
31.0% Alkylpolyglucoside
19.0% Poloxalene
2.0% Polydimethylsiloxane

Directions For Use		
Medalist is formulated for use on golf courses, athletic fields, residential and commercial turf and landscape areas. Follow tank mix applications with a brief watering-in of treated turf areas to ensure that Medalist moves to the soil profile.		
Golf Course Greens and Tees: As a Preventative Treatment	8 fl. oz. diluted in 1 to 3 gallons of water per 1,000 square feet in advance of high heat stress.	Apply an additional application of 8 fl. oz. per 1,000 square feet (7 to 14 days following initial application) diluted in the same manner.
Monthly Maintenance Schedule (Substitute for the Preventative Treatment)	Using dilution rates as indicated above; apply an initial application of 8 fl. oz. per 1,000 square feet.	Follow-up with monthly applications at a rate of 4 fl. oz. per 1,000 square feet.
Golf Course Fairways, Athletic Fields and General Turf Areas	32 to 48 fl. oz. diluted in 40 to 50 gallons of water per acre.	Reapply monthly throughout the season.
Irrigation Injection: Monthly Program	Inject 32 to 48 fl. oz. in 40 to 50 gallons of water per acre per month throughout the growing season.	
Soil Mixes and Lawn Care	8 fl. oz. diluted in 5 gallons of water, then apply to 1 cubic yard of soil mixture or each 1,000 square feet of planting area.	
Lawn Care	4 to 8 fl. oz. diluted in 2 to 3 gallons of water applied per 1,000 square feet.	

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING
2 x 2.5 gallon jugs / 36 cases per pallet
Item# MED02

30 gallon drum / 5 drums per pallet
Item# MED30

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

WETTING AGENT • SOIL SURFACTANT • WETTING AGENT • SOIL SURFACTANT • WETTING AGENT

Rain-Check®

IRRIGATION SOIL SURFACTANT

Maximize irrigation efficiency with Rain-Check.

Rain-Check is a multi-function soil surfactant and humectant that promotes rapid and complete soil wetting.

Rain-Check significantly reduces irrigation run times and allows managers to water less often by maximizing the efficiency of irrigation or rainfall.

Rain-Check makes every drop of water count, helping to reduce drought stress while improving plant health.

Rain-Check is biodegradable, non-toxic and safe for equipment.

Rain-Check is fertilizer-compatible and can be mixed in advance and used when needed, without falling out of solution when no agitation is present. By providing more uniform coverage, Rain-Check enhances fertilizer effectiveness.

Rain-Check has the ability to drain water-logged soils and facilitate water movement into the soil matrix.

RATES FOR INJECTION THROUGH IRRIGATION SYSTEMS	
Initial Application	Inject 1 quart of Rain-Check per acre.
Follow-Up Application	Inject 1 pint of Rain-Check per acre, or increase to meet the demand of the crop or environmental conditions.

RATES FOR CONVENTIONAL SPRAYERS	
Initial Application	Apply at 1 quart per acre diluted in sufficient water carrier for adequate spray distribution.
Follow-Up Application	Reapply Rain-Check at 1 pint per acre every four weeks to maintain efficacy.
Follow spray applications with a brief irrigation cycle to assist moving Rain-Check into the soil profile.	

NONPLANT FOOD INGREDIENTS

20.0% 1,2,3 propanetriol
20.0% Propylene glycol
10.0% Alcohols, C12-14-secondary, ethoxylated
7.5% D-glucopyranose, oligomeric, C9-11 alkyl glycosides
42.5% Inert Ingredients

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa
CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING
2 x 2.5 gallon jugs
36 cases per pallet
Item# RC02

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Stratum™

SOIL PENETRANT

Reduce yield-robbing soil compaction with the proven performance of Stratum.

Featuring a proprietary blend of ammonium alkyl-ether sulfate and alkylpolyglucoside, Stratum is an advanced soil penetrant that enhances the wettability of soils and root substrates.

By lowering water's adhesion properties and reducing the shear-strength of most soils, Stratum reduces soil crusting, improves tillage and lessens the likelihood of yield-robbing soil compaction.

PRINCIPAL FUNCTIONING AGENTS
53.0% Ammonium Alkyl Ether Sulfate, Alkylpolyglucoside

USE RATES FOR SOIL APPLICATIONS FOR AGRICULTURE		
General Rate:	6 to 12 fluid ounces of Stratum diluted in 15 to 20 gallons of water per acre.	
Sandy Soils:	6 to 10 fluid ounces of Stratum diluted in 5 to 20 gallons of water per acre at least twice per year.	
Heavy Clay Soils:	8 to 12 fluid ounces of Stratum diluted in 15 to 20 gallons of water per acre.	
USE RATES FOR SOIL APPLICATIONS FOR TURF		
General Rate:	Apply Stratum to highly maintained turf areas at a rate of 2 to 6 fluid ounces diluted in 1 to 2 gallons of water per 1,000 square feet; dilution with 2 gallons per 1,000 square feet is preferred.	Use the lower Stratum rate when frequent, weekly applications are being made. Use the higher rate with infrequent applications or when applying product to fine textured, clayey soils.
Irrigation Injection:	Stratum can be injected into irrigation systems at a rate of 4 to 8 fluid ounces per acre initially, followed by 2 fluid ounces per acre during subsequent irrigations, if needed.	
Soil Mixes or Soil-less Container Mixes:	Apply 30 fluid ounces of Stratum diluted in 10 to 20 gallons of water per 10 cubic yards of mix.	

PACKAGING
2 x 2.5 gallon jugs
36 cases per pallet
Item# STRAT02

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

WETTING AGENT • SOIL SURFACTANT • WETTING AGENT • SOIL SURFACTANT • WETTING AGENT

Tournament-Ready®

SOIL SURFACTANT

Tournament-Ready contains a blend of natural renewable-resource surfactant components combined with traditional surface-active agents that deliver long-lasting residual performance and works to prevent and control localized dry spots. Tournament-Ready Research has proven that organic coatings surrounding sandy particles inhibit the infiltration of soil moisture. In high-heat stress periods, delicate turfgrass can sustain injury or total loss due to lack of available moisture. Tournament-Ready will not harm beneficial soil microbes and has been developed with respect for the environment and worker safety. Tournament-Ready works wherever localized dry spot occurs: golf greens and tees, fairways, athletic fields, and residential or commercial lawns. Tournament-Ready reduces the surface and adhesive tensions of water. Tournament-Ready assists water's infiltration and drainage of compacted or hydrophobic soils.

Directions For Use

Follow tank mix applications with a brief watering-in of treated turf areas to ensure that Tournament-Ready moves to the soil profile.

Golf Course Greens and Tees: As a Preventative Treatment	8 fl. oz. diluted in 1 to 3 gallons of water per 1,000 square feet in advance of high heat stress	Apply an additional application of 8 fl. oz. per 1,000 square feet (7 to 14 days following initial application) diluted in the same manner.
Golf Course Greens and Tees: Monthly Maintenance Treatment Schedule	8 fl. oz. diluted in 1 to 3 gallons of water per 1,000 square feet	Follow with monthly applications of 4 fl. oz. diluted in 1 to 3 gallons of water per 1,000 square feet. Can be substituted for the Preventative Treatment (above)
Golf Course Fairways, Athletic Fields and General Turf Areas	16 to 24 fl. oz. in 40 to 50 gallons of water per acre	Reapply monthly throughout the season.
Irrigation Injection: Monthly Program	Inject 16 to 24 fl. oz. in 40 to 50 gallons of water per acre	Reapply monthly throughout the season.
Soil Mixes and Lawn Care	4 fl. oz. diluted in 5 gallons of water applied to 1 cubic yard (of soil mixture), or each 1,000 square feet (of planting area)	Apply as a drench to soil mix.
Lawn Care	2 to 4 fl. oz. diluted in 2 to 3 gallons of water applied per 1,000 square feet	Irrigate immediately following application to move product to soil profile.

NONPLANT FOOD INGREDIENTS
62.0% Alkylpolyglucoside and Siloxane Solution
38.0% Polyalkoxylate Blend

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING
5 gallon jug / 36 cases per pallet
Item# TUR05

30 gallon drum / 5 drums per pallet
Item# TUR30

55 gallon drum / 4 drums per pallet
Item# TUR55

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Tournament-Ready® Pellets

SOIL SURFACTANT

Tournament-Ready Pellets contain the proven Tournament-Ready liquid formula packaged in a convenient system for supplemental treatment of highly maintained turf areas.

Tournament-Ready Pellets will effectively treat localized dry spot in a range of soil types or turfgrass varieties.

Use Tournament-Ready Pellets as a part of a comprehensive water management program for curative or preventative treatment of localized dry spot.

Tournament-Ready Pellets are formulated for use on golf courses, athletic fields and residential or commercial turf.

NONPLANT FOOD INGREDIENTS
30.0% Alkylpolyglucoside
1.0% Siloxane
19.0% Poloxalene
50.0% Inert Binders

Directions For Use

Using available commercial in-line hose applicators, remove the plastic lid, insert the Tournament-Ready Pellet and the plastic jar into the reservoir of the hose-end applicator with the opening of the jar containing the pellet facing toward the flow of water. Secure the reservoir to the applicator and begin application. Inserting the jar with the pellet facing away from the water flow will slow the rate of erosion of the pellet thereby reducing the amount of wetting agent dispersed over time. This is an acceptable option for extending wetting agent use.

Golf Course Greens, Tees and Other Highly Maintained Turf Areas	1 pellet per 12,000 to 16,000 square feet (when watering at an average rate of 3 minutes per 1,000 square feet)	The rate at which a pellet dissolves varies with water pressure, flow rate and temperature
Golf Course Greens, Tees and Other Highly Maintained Turf Areas: Preventative Treatment	Follow-up maintenance in conjunction with regular turf management programs	

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

PACKAGING
24 x 6 ounce pellets per case
96 cases per pallet
Item# TRPEL

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Tournament-Ready® Plus Pellets with Actosol®

SURFACTANT WITH HUMIC ACID AND MICRONUTRIENT

Tournament-Ready Plus Pellets with Actosol contain a blend of soil surfactants combined with a water-soluble humic acid.

These components assist with reducing localized dry spot by providing uniform soil moisture content plus improving stress tolerance, water retention, and stimulation of root mass and plant growth.

Tournament-Ready soil surfactant and Actosol humic acid work in tandem to improve moisture holding and cationic exchange capacity of soils.

The humic acid ingredient covers certain naturally available soil minerals into plant-available form.

Tournament-Ready Plus Pellets with Actosol can assist to establish new plantings or maintain exiting areas resulting in improved soil moisture and soil mineral balance.

GUARANTEED ANALYSIS
0.5% iron (Fe)

NONPLANT FOOD INGREDIENTS
30.0% Alkylpolyglucoside
1.0% Siloxane
19.0% Poloxalene
2.0% Humic Acid from Leonardite
48.0% Inert Binders

actosol®
The Gold Standard of Humic Products

Directions For Use		
Using available commercial in-line hose applicators, remove the plastic lid, insert the Tournament-Ready Plus Pellets with Actosol and the plastic jar into the reservoir of the hose-end applicator with the opening of the jar containing the pellet facing toward the flow of water. Secure the reservoir to the applicator and begin application. Inserting the jar with the pellet facing away from the water flow will slow the rate of erosion of the pellet thereby reducing the amount of wetting agent dispersed over time. This is an acceptable option for extending wetting agent use.		
Golf Course Greens, Tees and Other Highly Maintained Turf Areas	Place one pellet into an applicator. Apply 2 to 4 minutes per 1,000 sq. feet of turfgrass.	The rate at which a pellet dissolves varies with water pressure, flow rate and temperature
Golf Course Greens, Tees and Other Highly Maintained Turf Areas: Preventative Treatment	Follow-up maintenance in conjunction with regular turf management programs	

PACKAGING
16 x 8 ounce pellets
96 cases per pallet
Item# TRPLPEL

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Variant™

SOIL SURFACTANT / SOIL RETENTION AGENT

QUANTUM
Variant Contains Quantum Technology.

Unlike traditional soil surfactants, Variant features Quantum Technology, a unique molecular structure with a water-attracting, oxygenated component that delivers increased efficacy and residual performance of certain soil-applied herbicides.

When applied according to label directions, Variant extends herbicide control and longevity by retaining more herbicide in the weed germination zone.

Variant allows residual herbicide programs to overlap, which helps in controlling resistant weeds.

Variant improves activation of herbicides under low or high rainfall conditions.

Variant's advanced polymerized resins and fatty acids allow for earlier applications of both burndown and residual herbicides in a wide range of moisture conditions and soil types.

NONPLANT FOOD INGREDIENTS
20.0% Ethoxylated Triglyceride
20.0% Copolymer of Alpha- and Beta-Pinene

USE RATES	
Use rates are determined by the volume of liquid carrier applied per acre.	
GPA Spray Volume	**Use Rate Per Acre**
5-10	8 fl. oz.
10-20	16 fl. oz.
20-30	24 fl. oz.
30+	32 fl. oz.

PACKAGING
2 x 2.5 gallon jugs
36 cases per pallet
Item# VAR02

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

WETTING AGENT • SOIL SURFACTANT • WETTING AGENT • SOIL SURFACTANT • WETTING AGENT

Adjuvants & Spray Modifiers

Bio-90™

NONIONIC SURFACTANT / HUMECTANT / ANTIFOAMING AGENT

Bio-90 is a nonionic surfactant formulated for increasing the efficacy of various agricultural and horticultural spray applications.

Bio-90 should be used where wetting and uniform coverage of the spray is required.

Bio-90 improves the performance of the active spray ingredients by giving more uniform distribution and better wetting of the plant surface.

Bio-90 is intended for use with pesticides that are labeled for agricultural and non-agricultural uses. Some pesticide labels recommend a higher or lower surfactant use rate for optimum efficacy. Follow the pesticide label directions when this occurs.

Bio-90 can be used with most insecticides, fungicides, herbicides, defoliants and desiccants to improve the performance of the active spray ingredients by giving more uniform distribution and better wetting of the plant surface.

Bio-90 is a broad-spectrum adjuvant specifically designed for optimum activity enhancement when used with a wide range of pesticides and solvents such as water, aromatics, alcohol and alphatics.

Not approved for aquatic use.

USE RATES		
Do not add this product at a rate which exceeds 0.375% of the finished spray volume.		
Herbicides	1 to 3 pints per 100 gallons	Improves the performance of the active spray ingredients by giving more uniform distribution and better wetting of the plant surface.
Fungicides	3 to 8 fluid ounces per 100 gallons	
Insecticides	3 to 8 fluid ounces per 100 gallons	
Defoliants & Desiccants	1 to 2 pints per 100 gallons	
Acaricides	3 to 8 fluid ounces per 100 gallons	
Wettable Powders, Water Soluble Materials, Emulsifiable Products	Add Bio-90 in water after a good mixture is formed.	
For Use With Glyphosate Herbicides	Refer to the herbicide label for recommended surfactant rates.	

PRINCIPAL FUNCTIONING AGENTS
90.0% Branched Alkyl Phenol Ethoxylate, Propylene Glycol, Tall Oil

All ingredients are exempt from the requirement of a tolerance under 40 CFR 180

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

dpr Approved For Use In CALIFORNIA

WSDA Approved For Use In WASHINGTON

PACKAGING
12 x 1 quart jugs / 60 cases per pallet
Item# BI901Q
4 x 1 gallon jugs / 36 cases per pallet
Item# BI9001
2 x 2.5 gallon jugs / 36 cases per pallet
Item# BI9002

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with. Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Bio-Film® Extra

SPREADER-STICKER ADJUVANT

Bio-Film Extra is a self-emulsifiable, nonionic spreader-sticker adjuvant intended for use with most plant protection products in which the label permits the use of a spreader-sticker.

Bio-Film Extra is compatible in spray solutions with most commercial plant protection products and foliar feed micronutrients.

A thin coating of Bio-Film Extra forms an elastic film and bonds the accompanying tank mix product to the plant foliage. This enhances the efficiency of the spray application and minimizes loss through rainfall or irrigation run-off.

Not approved for aquatic use.

PRINCIPAL FUNCTIONING AGENTS

100.0% Alkylphenol, Hydroxyl-polyoxyethylene, Polymerized Resins and Fatty Acids, Paraffin Base Petroleum Oil

All ingredients are exempt from the requirement of a tolerance under 40 CFR 180

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

dpr Approved For Use In CALIFORNIA

PACKAGING

4 x 1 gallon jugs
36 cases per pallet
Item# BFE01

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

USE RATES	
Observe spray patterns and adjust the amount of Bio-Film Extra as needed.	
Fungicides	4 to 16 fl. oz. per 100 gallons of spray mix
Acaricides	4 to 16 fl. oz. per 100 gallons of spray mix
Insecticides	4 to 16 fl. oz. per 100 gallons of spray mix
Aerial Application	4 to 16 fl. oz. depending on usage and spray equipment

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with. Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Cadence™

HUMECTANT / NONIONIC SURFACTANT / WETTING AGENT / DEFOAMING AGENT

Cadence is a surfactant based on organomodified siloxane technology for use in water-based pesticide formulations. While Cadence has been proven to be a highly efficient surfactant; timing, weather conditions, methods of application, crop conditions, and/or mixture with other chemicals not specifically recommended are beyond the control of the seller. CONTAINS NONPLANT FOOD INGREDIENTS.

Not approved for aquatic use.

PRINCIPAL FUNCTIONING AGENTS

100.0% Diethylene Glycol, Polyether-Polymethylsiloxane-Copolymer, Alkylphenol Ethoxylate, Dimethylpolysiloxane

All ingredients are exempt from the requirement of a tolerance under 40 CFR 180

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

dpr Approved For Use In CALIFORNIA

WSDA Approved For Use In WASHINGTON

PACKAGING

6 x 1 quart bottles / 60 cases per pallet
Item# CADEN1Q

4 x 1 gallon jugs / 36 cases per pallet
Item# CADEN01

2 x 2.5 gallon jugs / 36 cases per pallet
Item# CADEN02

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

USE RATES		
As A Spray Adjuvant With Herbicide	16 fl. oz. per 100 gallons, or 1.6 fl. oz. per acre using a 10 gallon per acre spray rate	
As An Adjuvant with Herbicides, Micronutrients or Defoliants	6 to 16 fl. oz. per 100 gallons of spray solution	
As An Adjuvant with Insecticide, Miticides or Fungicides	6 to 12 fl. oz. per 100 gallons of spray solution	
For Use with Aerial Applications	12 to 16 fl. oz. per 100 gallon of spray solution	
As A Soil Wetting Agent (Such as Golf Course Tees and Greens)	0.1% v/v, or use the following spray rates per 1,000 square feet: 1/8 fl. oz. in 1 gallon of water; or 1/5 fl. oz. in 1.5 gallons of water; or 1/4 fl. oz. in 2 gallons of water	
For Large Turf Areas (Such as Golf Fairways): Boom Sprayers	0.05% to 0.1% v/v concentration, or 6 to 13 fl. oz. per 100 gallons of tank mix/water	
Injection Through Irrigation	1,000:1 To accommodate 100:1 proportioners, mix a 10% solution of Cadence and water and inject at 100:1	Adjust proportioning valve to inject at the ratio 1:1000, based on weekly application.
As a Mulch, Peat or Potting Soil Wetting Agent	0.05% to 0.1% v/v concentration, or 6 to 13 fl. oz. per 100 gallons	Repeat as needed.
As a Dew Control Agent	0.1% v/v concentration, or 13 fl. oz. (approx.) per 100 gallons of water every 7 to 10 days	Will prevent dew formation on turf areas such as tees and greens. Apply with a boom sprayer or hand sprayer.
For Use with Liquid Fertilization	6 to 13 fl. oz. per 100 gallons of mix	

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with. Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

ADJUVANT AND SPRAY MODIFIER • ADJUVANT AND SPRAY MODIFIER

Clarion™

MODIFIED VEGETABLE OIL / NONIONIC SURFACTANT

Clarion is a unique blend of highly refined and modified spray oil and nonionic organosilicone.

Clarion's unique chemistry allows for enhanced wetting and absorption of those pesticides or products recommending the addition of a spray adjuvant to improve performance.

The addition of Clarion to a spray tank solution will improve a spray application by physically modifying the wetting and spreading characteristics, the result being a more uniform spray deposit.

Observe the initial application to insure thorough coverage without excessive runoff of the spray.

Not approved for aquatic use.

PRINCIPAL FUNCTIONING AGENTS

100.0% Methyl Soyate, Methylated Silicones, Ethoxylated Castor Oil

All ingredients are exempt from the requirement of a tolerance under 40 CFR 180

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

CPDA Certified

Enlist One® COLEX-D® technology HERBICIDE

dpr Approved For Use In CALIFORNIA

WSDA Approved For Use In WASHINGTON

Approved for use with Enlist One, a registered trademark of Corteva Cropscience.

PACKAGING

4 x 1 gallon jugs / 36 cases per pallet
Item# CLAR01

2 x 2.5 gallon jugs / 36 cases per pallet
Item# CLAR02

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

GROUND AND AERIAL USE RATES

Clarion is intended for use with pesticides that are labeled for agricultural and non-agricultural uses. The use of Clarion can increase pesticidal activity where the following factors occur, but is not limited to:
1) Low humidity and high temperatures;
2) Low water volume rates of less than 15 gallons per acre; and
3) when target species are larger than the label recommendations at time of application.
For optimum results, spray mixes containing KALO Clarion should be applied within 36 hours.

Ground Rate	3 to 5 pints per 100 gallons
Aerial Rate	6 to 16 pints per 100 gallons
NOTE:	The application rates on this label are based on pesticides recommending the use of a nonionic surfactant. Rates of this product may be increased or decreased for optimum results. Follow pesticide labeling for proper recommendations. Before using Clarion where a nonionic surfactant may not be recommended, the user or applicator advisor must have experience with the combination or must have conducted a phytotoxicity trial.

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Modified Vegetable Oil™

MODIFIED VEGETABLE OIL CONCENTRATE AND ANTIFOAMING AGENT

Modified Vegetable Oil (MVO) is a unique blend of highly refined and modified spray oil and superior nonionic surfactants.

MVO's chemistry allows for superior wetting and absorption of those pesticides or products which labels recommend the addition of a spray adjuvant to improve coverage.

The addition of MVO to a spray tank solution will improve a spray application by physically modifying the deposition and wetting characteristics of the spray solution, the result being a more uniform spray deposit.

The use of MVO can increase pesticidal activity where the following factors occur, but is not limited to:

1. When used in areas of the country with low relative humidity and high temperatures.

2. When target species are larger than label recommendations at time of application.

Not approved for aquatic use.

PRINCIPAL FUNCTIONING AGENTS

98.1% Methyl Soyate, Polyethylene Glycol Nonylphenyl Ether, Methylated Silicones

All ingredients are exempt from the requirement of a tolerance under 40 CFR 180

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

Engenia Herbicide

XTENDIMAX with VaporGrip Technology

dpr Approved For Use In CALIFORNIA

WSDA Approved For Use In WASHINGTON

Approved for use with Engenia, a registered trademark of BASF Corporation.
Approved for use with XtendiMax, a registered trademark of Bayer.

PACKAGING

2 x 2.5 gallon jugs
48 cases per pallet
Item# MVO02

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

USE RATES

A compatibility test is recommended prior to use. For optimum results, spray mixes containing MVO should be applied within 36 hours. Higher rates may be required on hard to control weeds or weeds which are under stress.

Typical Use Rate	1.5 to 2 pints per acre	The 2.0 pints per acre rate may be required if weed populations are extreme or if plants are stressed at the time of treatment.

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

ADJUVANT AND SPRAY MODIFIER • ADJUVANT AND SPRAY MODIFIER

Tronic®

NONIONIC SURFACTANT

QUANTUM
Tronic Contains Quantum Technology.

A Unique Vegetable Derived Nonionic Surfactant and Crop Oil Replacement

Tronic is a premium high concentrate 95% active low-foaming nonionic surfactant which will replace crop oil and modified seed oil concentrates.

Tronic is a unique surfactant which improves the deposition and penetration of active ingredients into the target plant.

Tronic contains free fatty acids to improve rain fastness and wash-off resistance.

Tronic is designed for use with herbicides, insecticides, fungicides, defoliants, desiccants, plant growth regulators, and any other crop protection product where an oil concentrate or a nonionic surfactant is required or recommended. When used according to the Directions for Use, Tronic is compatible with most pesticides and fertilizers.

An integrated antifoaming system helps minimize foam in the spray tank.

The efficacy of Tronic and the effects of the spray application may be affected by various environmental factors and the condition and operation of the sprayer. Periodic calibration of spray equipment and visual inspection of the spray application may necessitate an adjustment of the adjuvant rate.

Tronic is part of the Quantum Adjuvant Techology. Quantum can serve as a low use-rate replacement for crop oil, methylated seed oil and nonionic surfactants. Always follow pesticide label instructions regarding adjuvant use.

GROUND, AERIAL AND AQUATIC USE RATES		
Ground Application	1 to 3 pints per 100 gallons of spray solution	
Aerial Application	4 to 8 fl. oz. per acre	Refer to pesticide label for minimum water volume per acre.
Aquatic Application	2 to 4 pints per 100 gallons of spray solution	

PRINCIPAL FUNCTIONING AGENTS

95.0% Vegetable Oil Ethoxylate, Tall Oil Fatty Acids

All ingredients are exempt from the requirement of a tolerance under 40 CFR 180

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

FeXapan® Plus VaporGrip® Technology HERBICIDE

Enlist One® COLEX-D® technology HERBICIDE

XTENDIMAX® with VaporGrip® Technology

dpr Approved For Use In CALIFORNIA

WSDA Approved For Use In WASHINGTON

Approved for use with Enlist One, a registered trademark of Corteva Cropscience.

Approved for use with XtendiMax, a registered trademark of Bayer.

PACKAGING

4 x 1 gallon jugs / 36 cases per pallet
Item# TRONIC01

2 x 2.5 gallon jugs / 36 cases per pallet
Item# TRONIC02

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Water FX™

DRY WATER CONDITIONER / ACIDIFYING AGENT

A significant challenge with managing spray water quality exists due to hard water minerals and water pH levels that antagonize the performance of various plant control products.

Water FX is a blend of dry water-soluble granules that contain a nitrogen based water conditioner and acidifying agent.

Water FX is intended for use with plant control products that are used in agriculture, horticulture, turf, ornamental and other non-crop applications.

Water FX contains ammonium sulfate which neutralizes hard water minerals that can reduce the effectiveness of many plant control products. The acidifying agent in Water FX lowers the spray water pH level to optimize the efficacy of insecticide, herbicide and fungicide products that perform better with a lower pH.

Always read and follow the label instructions of the accompanying plant control product to confirm the acceptable ranges of spray water pH and susceptibilities to hard water antagonism.

Mixing Instructions

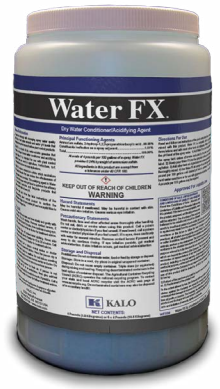
1) Add Water FX as the first ingredient to the spray tank unless otherwise instructed by the plant control product label.
2) Slowly pour Water FX into the spray tank at the point of maximum agitation.
3) Add other tank mix ingredients and continue recirculating until thoroughly mixed.

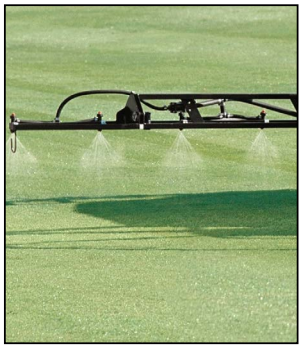
Directions For Use		
At a rate of 4 pounds per 100 gallons of a spray, Water FX provides 0.24% by weight of ammonium sulfate. Read and follow use instructions of the plant control label that is to be tank mixed with this product.		
To Achieve Desired pH Level	Begin at 1/2 pound per 100 gallons until desired pH level is achieved	Water FX will lower the pH level of the spray water.
For Extremely Hard Water Conditions	Up to 4 pounds per 100 gallons may be required	
For Use With Glyphosate Herbicides	Up to 4 pounds per 100 gallons may be required	Water FX is compatible with all glyphosate formulations and with most other tank mix adjuvants.

PRINCIPAL FUNCTIONING AGENTS

98.99% Ammonium Sulfate, 2-Hydroxy-1,2,3-Propanetricarboxylic Acid

All ingredients are exempt from the requirement of a tolerance under 40 CFR 180





PACKAGING

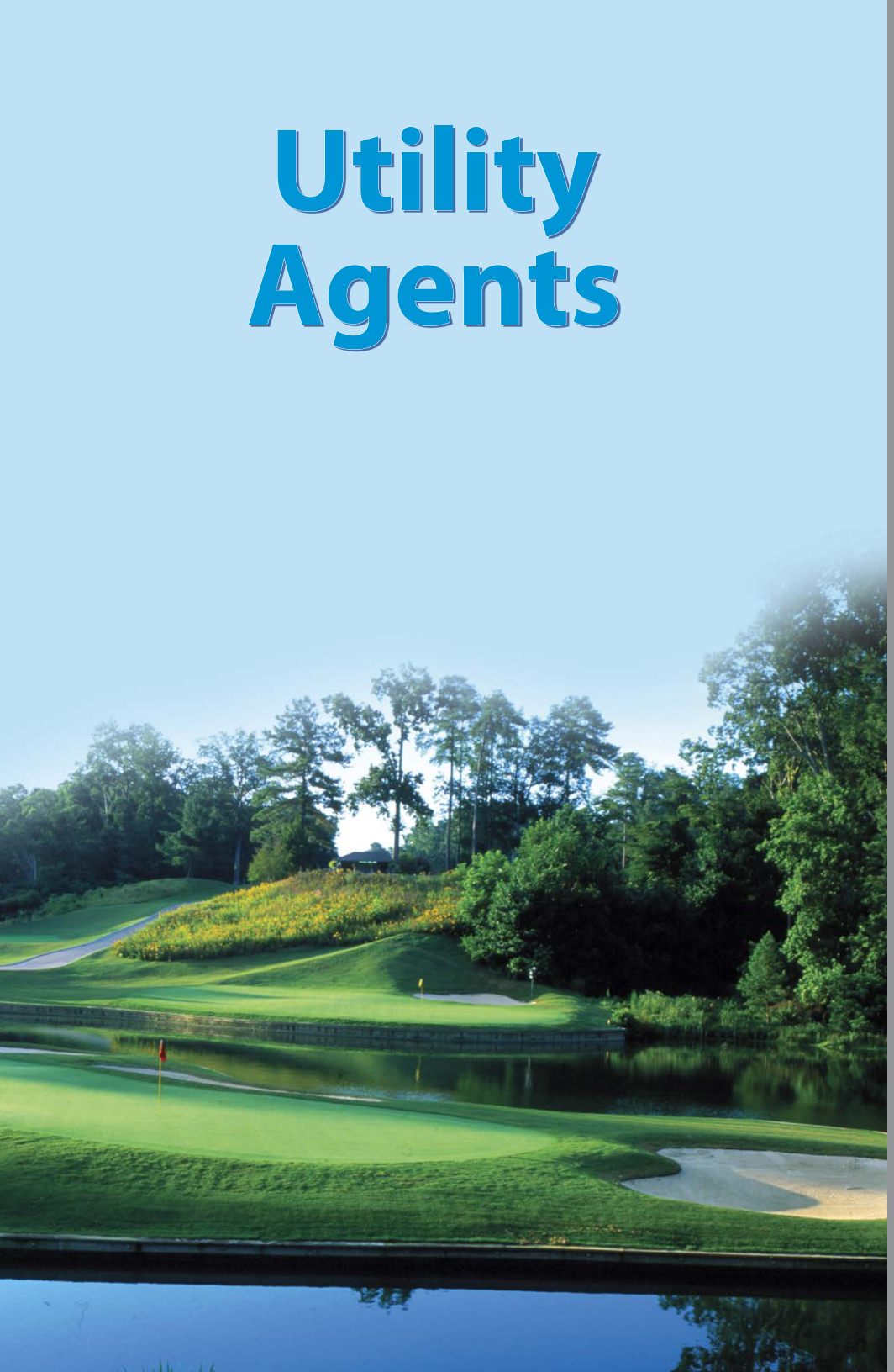
6 x 4 pound jar
10 cases per pallet
Item# WFX04

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

ADJUVANT AND SPRAY MODIFIER • ADJUVANT AND SPRAY MODIFIER

Utility Agents



Anti-Foam™

ANTIFOAMING AND DEFOAMING AGENT

Anti-Foam is a fast, effective defoamer for use in suppressing foam. Controlling foam reduces filling time and lessens overflow waste. Anti-Foam improves spray performance. The combination of effective ingredients allows for very fast knockdown of troublesome foam if it should occur in the spray tank.

About Antifoaming & Defoaming Agents

How do antifoamers/defoamers work?
Controlling or knocking down foam is a physical process – not chemical. Hydrophobic chemicals (silicone, aluminum stearate, propylene-oxide, etc.) penetrate and physically break bubble walls. Through this process, foam generating chemicals are adsorbed on the bubble surface, thinning the bubble wall, and ultimately cause them to burst or never form.

Antifoamer vs. Defoamer
Antifoam products are designed to be added to the tank mix for the purpose of preventing foam in the spray tank. Defoamer products are designed to knockdown foam once it has developed in the spray tank. Some antifoam products do contain knockdown ability and can be used for both purposes.

Why do some products work so much better than others at controlling and knocking down foam?
Not all products are created equally! The active ingredient in most common antifoamer and defoamer products is dimethyl polysiloxane. Performance can be a function of active ingredient levels and proper use rate – common products contain from 10 to 30% of active ingredient levels and general use rates vary accordingly. Even though most products contain the same active ingredient, the formulations can vary greatly. Well engineered and formulated products can substantially out-perform poor products with higher levels of the same active ingredient. Performance is greatly a function of how well the antifoamer and/or defoamer adjuvant emulsifies and reacts in the spray tank.

USE RATES

Shake well before using. Agitation is recommended to aid in dispersion of the various components.

General Use Rate	1 to 2 fl. oz. per 100 gallons of spray mixture	Add Anti-Foam to the spray mixture before the pesticide, or any additional surfactant is added.
For Recirculating Sprayers	4 fl. oz. per 100 gallons of spray mixture	
If Foam Has Already Occurred	6 fl. oz. per 100 gallons of spray mixture	

PRINCIPAL FUNCTIONING AGENTS

10.0% Polydimethylsiloxane, Slicon Dioxide

All ingredients are exempt from the requirement of a tolerance under 40 CFR 180

REGISTRATIONS, CERTIFICATIONS, & APPROVALS

dpr Approved For Use In CALIFORNIA

WSDA Approved For Use In WASHINGTON

PACKAGING
12 x 1 quart bottles
36 cases per pallet
Item# AF1Q

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with. Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Benchmark™

FOAM MARKING AGENT

This foam concentrate is specially formulated to deliver long lasting foam in a range of weather and field conditions.

This highly concentrated formula, when used as directed, will produce a thick, white, highly visible foam. This foam can be used with any foam marker equipment for fertilizer and pesticide applications, seed planting and general field cultivation.

This product is formulated to handle extreme hard water and high temperature conditions.

Benchmark foam marking agent, when used at proper consistency and foam volume, should be visible for up to 40% longer than traditional foaming agents.

Foam will disappear faster when placed on dry soil under bright sunlight, high temperature and high wind conditions.

PRINCIPAL FUNCTIONING AGENTS

100.0% Proprietary Blend of Active Foam Agents

USE RATES		
Always thoroughly clean out the foam generator reservoir and lines when changing from one brand of foam marker to another. Use a high quality tank cleaner to remove residues and ensure optimum performance. This product is effective at a range of application rates. The addition of water conditioners is generally not recommended.		
Standard Use Rate	1 gallon for every 160 gallons of water, or, 8 fl. oz. for every 10 gallons	
If Foam Colorant Additive Is Being Used	2 fl. oz. for every 1 gallon of solution reservoir capacity	Use highest rate when adding a foam colorant.
If Adverse Conditions Exist (High Temperature / Hard Water)	2 fl. oz. for every 1 gallon of solution reservoir capacity	
Hard Water (Up to 1,500 ppm)	This product performs well in hard water up to 1,500 ppm	
If Foam Solution Is Used In Near Freezing Temperatures	2 to 3 fl. oz. of methanol per 1 gallon of foam solution for immediate use	Mixes well in cold water.
NOTE:	Foam will disappear faster when placed on dry soil under bright sunlight, high temperature and high wind conditions. The concentrate when used at proper consistency and foam volume, should be visible for up to 40% longer than traditional foaming agents.	

PACKAGING

4 x 1 gallon jugs / 36 cases per pallet
Item# BMK01

30 gallon drum / 4 drums per pallet
Item# BMK30

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

K-Klean™

LIQUID TANK AND EQUIPMENT CLEANER

K-Klean is an effective cleaner for metal, fiberglass and plastic spray systems.

K-Klean aids in the removal of dirt, grime, grease, chemical and fertilizer residues from tanks and equipment.

K-Klean helps eliminate rust and scale and keeps costly equipment in ready-to-use condition.

PRINCIPAL FUNCTIONING AGENTS

100.0% Cleaning Agents in a Proprietary Transparent Emulsion

USE RATES		
K-Klean is effective at dilution rates of up to 1:100.		
For Large Volume Sprayers	1 quart will treat 100 gallons of water	Adjust the dilution rate as needed for individual conditions. Circulate treated solution throughout the entire spray system for 5 to 10 minutes. Use a high-pressure sprayer or hose to rinse all interior areas and tank walls. Purge hoses, spray lines and nozzles for at least one minute. After cleaning, drain system and rinse tanks and spray areas.
For Tanks Or Sprayers (Not Equipped With Hand-Gun or Hose)	1 quart per 100 gallons of water	
Cleaning Procedures	After spraying, drain tank, hoses and boom completely. Rinse inside of tank of visible residues using approved site for handling pesticides. Fill tank half-full with clean water and add K-Klean at selected rate. Agitate and flush the hoses and boom with cleaning solution. Fill with water making sure the tank is completely full and allow to stand for 10 minutes with agitation. Flush the hoses and boom and drain tank completely.	

PACKAGING

4 x 1 gallon jugs
36 cases per pallet
Item# FM01

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Tank Cleaner™

DRY TANK & EQUIPMENT CLEANER

Tank Cleaner is designed for cleaning tanks, lines and nozzles to remove pesticide, herbicide and fertilizer residues.

Tank Cleaner also removes light rust and dissolves deposit buildups while leaving a protective film that helps prevent corrosion.

Color dye in Tank Cleaner indicates ingredients are still active in solution.

Tank Cleaner leaves a protective film that helps prevent corrosion.

CONTAINS
Complex Phosphates, Sodium Sulfate, Sodium Carbonate, Sodium Hydroxide, Monocyclic Terpenes and Nonionic Surfactant

USE RATES		
For Tanks or Sprayers Not Equipped with Hand-Gun or Hose	Fill tank with water first, then add 1 pound per 100 gallons of water	Close valve to spray boom, open by-pass valve and agitate vigorously for 15 minutes. Use hand gun or hose to cleanse inside of tank. Open spray boom to flush Tank Cleaner and water solution out of tank.
For Small Sprayer	1 teaspoon per 1 gallon of water	Agitate vigorously, rinse with water, then repeat procedure.
For Sulfonylurea Clean-Out	May require up to 2 pounds per 100 gallons	Some pesticides including, but not limited to, sulfonylurea and phenoxy herbicides (i.e. Classic® and 2-4,D respectively) are active at very small amounts. Classic® is a Reg. Trademark of Corteva
For Cleaning Fertilizer Equipment	Flush equipment with water. Mix 1 pound of Tank Cleaner in 50 gallons of water and spray all parts that have been in contact with fertilizer with Tank Cleaner and water solution.	Always flush with water before reuse.
For Sprayers Being Reused Immediately	Refill tank with 100 gallons of water	Close hand gun valve and empty sprayer through boom nozzles.
For Sprayers Being Stored	Do not rinse after treatment.	Tank Cleaner leaves a protective film to prevent corrosion.

PACKAGING
12 x 1 pound jar
10 cases per pallet
Item# TC01

6 x 4 pound jar
10 cases per pallet
Item# TC04

30 pound drum
10 drums per pallet
Item# TC30

SCAN QR CODE FOR MORE INFORMATION ON THIS PRODUCT

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

CONVERSION TABLES

How to Calculate Liquid Nutrients

Formula Examples:

Nutrients per gallon of product

Weight per gallon × % nutrient = lbs. nutrient 18-3-6

10.33 lbs. per gal. × 18% nitrogen = 1.9 lbs. nitrogen per gallon

1.9 lbs. nitrogen per gal. ÷ 128 oz. = 0.0148 lbs. nitrogen per ounce

Liquid Conversions

Gals	Qts	Pts	Ozs	Cups	Tbl	Tsp	Mls	Ltrs
1	4	8	128	16	256	768	3,480	3.785
	1	2	32	4	64	192	960	0.946
		1	16	2	32	96	480	0.473
			1	1/8	2	6	30	0.030
				1	16	48	240	0.240
					1	3	15	0.015
						1	5	0.005

Parts Per Million

One part per million is one pound in a million pounds. 120,000 gallons of water equals 1,000,000 pounds (constant). To calculate ppm use this formula:

$$\frac{\text{Pounds of Ingredients Used} \times 120{,}000}{\text{Gallons of Water Treated}} = \text{ppm}$$

Area

1 sq. foot = 144 sq. inches
1 sq. yard = 9 sq. feet
1 sq. meter = 10.76 sq. feet
1 sq. meter = 1.20 sq. yards
1 sq. mile = 2.59 sq. kilometers
1 sq. mile = 640 acres
1 sq. mile = 259 hectares
1 sq. kilometer = 0.386 sq. miles
1 sq. kilometer = 247.10 acres
1 sq. kilometer = 100 hectares
1 acre = 43,560 sq. feet
1 acre = 4,840 sq. yards
1 hectare = 2.47 acres

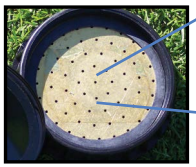
Dry Weight Measure

1 gram = 0.035 ounces
1/2 ounce = 14.17 grams
1 ounce = 28.35 grams
3 ounces = 85.05 grams
3.75 ounces = 106.31 grams
4 ounces = 113.4 grams
8 ounces = 226.8 grams
12 ounces = 340.19 grams
16 ounces = 453.6 grams
0.5 pounds = 226.8 grams
1 pound = 453.6 grams
1 kilogram = 2.20 pounds

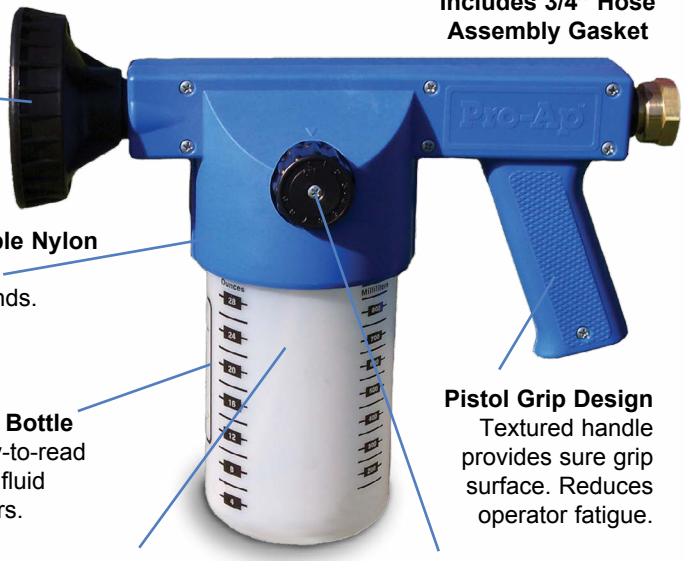
Pro-Ap®

FOR KALO TURF WETTING AGENT APPLICATIONS

Shower-Type Nozzle
Proven design provides gentle spray while ensuring uniform coverage. Includes brass screen which can be removed for cleaning.



Includes 3/4" Hose Assembly Gasket



Lightweight Durable Nylon Construction
Weighs only 3 pounds.
Chemical resistant.
UV protected.

High Density Poly Bottle
32 fl. oz. size. Easy-to-read calibrations in both fluid ounces and milliliters.

Pistol Grip Design
Textured handle provides sure grip surface. Reduces operator fatigue.

Needle Valve Metering Chamber
Engineered venturi siphons and mixes proper amount of chemical into water flow.

Adjustable Metering Dial
10 additive settings including "water only." The knob can be removed to prevent tampering with a predetermined setting.

The Pro-Ap Applicator operates on water pressure. Water flowing over a small orifice creates a suction that lifts and mixes the chemical additive into the spray stream.

The Pro-Ap Applicator was specifically designed to apply KALO turf wetting agents to dry spots and small turf areas. The applicator design allows for small quantities of liquid product to be applied with large volumes of water. The Pro-Ap Applicator can be used to apply liquid fertilizer and micronutrients.

Notice: The Pro-Ap Applicator does not contain a back flow preventer. Your water system should have an anti-siphon device to eliminate any possibility of contamination of water sources.

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

Pro-Ap®

FOR KALO TURF WETTING AGENT APPLICATIONS

Applications
Proper application of product depends upon *water flow rate, metering dial setting* and *application time.*

Water Flow Rate
Determine the water flow rate in gallons per minute (gpm) from the water source being used. The gpm can be determined by attaching the Pro-Ap to the hose and filling a known size container. Note the time it takes to fill the container, then calculate the gpm.

Example: If it takes 24 seconds to fill a 5 gallon bucket, then the flow rate is 12.5 gpm.
(5 gallon ÷ 24 seconds x 60 seconds = 12.5 gpm)

Metering Dial Setting
The metering dial setting determines the amount of product siphoned from the bottle. A measurement can be made by filling the bottle with water and setting the metering dial to desired setting (No. 2 setting is most commonly used*). *Note: Setting the metering dial to "off" prevents any siphoning of the product.* Measure the amount (fl. oz. or ml.) removed from the bottle in one minute.

A separate measurement could be made for each metering dial setting.

*Note: Remember, viscosity of each product used will likely alter the application rate and the metering dial setting. Tournament-Ready viscosity is such that it should be calibrated separately.

Application Time
Knowing the water flow rate of the water source, and the amount of product used with each metering dial setting, helps determine the required application time to apply the proper amount of product at the proper dilution rate to achieve 1,000 square feet.

For future reference, note the amount siphoned per minute for each dial setting.

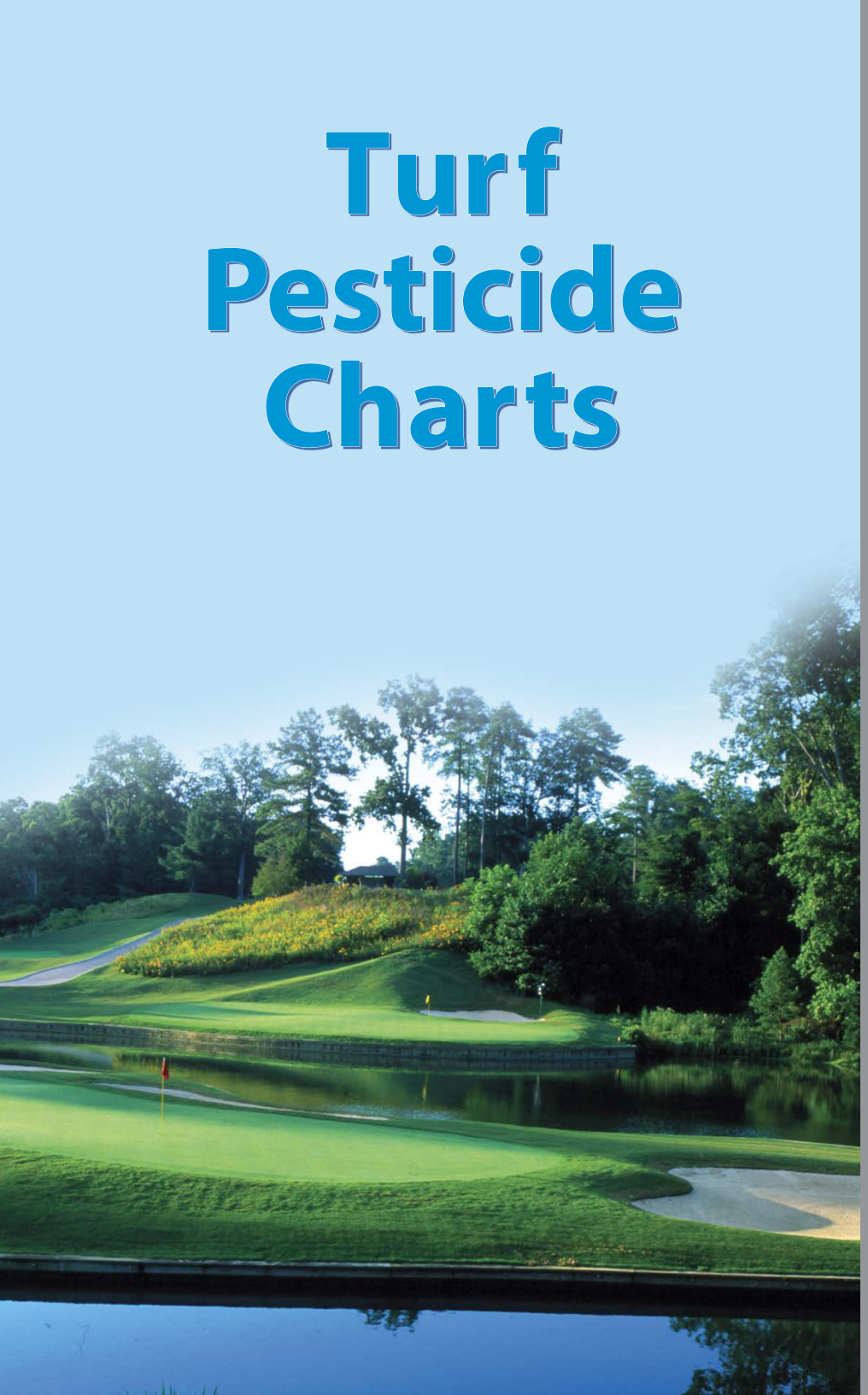
Dial Setting	ozs or mls
1	
2	
3	
4	
5	
6	
7	
8	
9	

REMOVABLE METERING DIAL
The Pro-Ap metering dial is designed so that it can be removed with a phillips screwdriver. After the proper dial setting has been determined, removal of the knob will prevent tampering with the pre-determined setting. To reset the metering dial, reattach the knob. Using a flat head screwdriver, turn the needle valve insert clockwise until it stops, prior to reinstalling knob.

Read and follow the precautions and directions for use on the product label and the pesticide it is being applied with.
Always follow pesticide label directions, acceptable practices and advice from your crop consultant.

PRO-AP APPLICATOR • PRO-AP APPLICATOR • PRO-AP APPLICATOR • PRO-AP APPLICATOR

Turf Pesticide Charts



TURF PESTICIDE CHART

HERBICIDES

Herbicides (Ag Brand)	Herbicides (Turf Brand)	Manufacturer	Active Ingredient	Primary Use Application	Typical Use Rate	Adjuvant Recommendation
WHIP	ACCLAIM EXTRA	Aventis	fenoxaprop-p-ethyl	A post-emergence selective herbicide for control of crabgrass, goosegrass and other grassed in cool season turf.	3.5-39 oz/acre. 0.08-0.90 oz/ 1,000 sq. ft.	The addition of a surfactant will improve coverage. In high volume spray gun applications, add 32 oz of surfactant/100 gallons.
BASAGRAN	BASAGRAN T/O	BASF	bentazon	Post-emergence herbicide for use in established turf, ornamentals, and roadsides, for control of broadleaf weeds and sedges.	0.75 oz/ 1,000 sq. ft. 2 pts/acre	Use 0.75 oz/1,000 sq. ft. or 2 pts/acre of crop oil concentrate.
REDEEM R&P	CONFRONT	Dow AgroSciences	triclopyr/ clopyralid	Specialty herbicide for the control of annual and perennial broadleaf weeds in established turf.	0.37-0.74 oz/ 1,000 sq. ft 1-2 pts/acre	Turf label suggests the use of a surfactant for low volume applications of 5-20 gpa (1/4-1/2 pt of surfactant/acre). The label also makes a strong statement with regards to caution, regarding spray drift, but no specific recommendation for a drift control adjuvant.
	COOL POWER	Riverdale	MCPA/triclopyr/dicamba acid	A premium post-emergence herbicide for broadleaf weed control. Excellent for winter weed control in dormant warm-season turf and early season application in cool season turf.	0.91-1.29 oz in 0.5-5.5 gallons of water/1,000 sq. ft. 2.5-3.5 pts/acre	Adding oil or surfactant may increase effectiveness on weeds, but may reduce selectivity to turf, resulting in turf damage. Not for use on turf being grown for sale or other commercial use as sod. Also, avoid drift to vegetables, flowers, ornamentals, or other sensitive plants. No specific recommendation for a drift control agent.
	DIMENSION	Rohm and Haas	dithiopyr	Selective herbicide for pre and post-control of crabgrass and other listed annual grasses and broadleaf weeds in established lawns and ornamental turf.	0.75-1.5 oz/ 1,000 sq. ft. 1-2 qts/acre	Addition of a surfactant at 2 qts/100 gallons of water may improve early post-emergence control.
FACET AND PARAMOUNT	DRIVE 75DF	TopPro (BASF)	quinclorac	Post-emergence herbicide for residential and non-residential turfgrasses for the extended control of many broadleaf and grass weeds.	0.367 oz/1,000 sq. ft. 1 lb/acre	To achieve consistent weed control, add a methylated seed oil at 0.55 oz/1,000 sq. ft. or 2 pts/acre. The potential for leaf burn is increased in high RH and high temperature.
SELECT	ENVOY	Valent	clethodim	A post-emergent herbicide for use on ornamentals, conifer trees, non-bearing food crops and non-crop or non-planted areas (NOT for use on TURF).	0.4-0.8 oz/1,000 sq. ft. 17-34 oz/acre	On ornamental plants, add a surfactant at 2 pts/100 gallons, and on conifer trees, non-bearing food crops, non-crop, or non-planted areas, add a crop oil concentrate at 1 gallon/100 gallons. Label states to avoid spray drift but does not suggest a spray drift adjuvant.

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This chart is a compilation of various plant control label information and is thought to be reliable. Consult package label to confirm use instructions. This is not a recommendation for use of these tank mix combinations.

TURF PESTICIDE CHART

HERBICIDES

Herbicides (Ag Brand)	Herbicides (Turf Brand)	Manufacturer	Active Ingredient	Primary Use Application	Typical Use Rate	Adjuvant Recommendation
LIBERTY	FINALE	Aventis	glufosinate-ammonium	Broad-spectrum, non-selective post-emergence herbicide for specific uses such as trimming and edging (NOT for use on TURF).	1.5-4 oz/gallon of water 2-6 qts/acre	Weed control may be improved by adding 8.5-17 lbs of ammonium sulfate/100 gallons of water. Avoid spray contact on desirable plants. Do NOT spray during windy conditions. No drift adjuvant suggested by label.
FUSILADE DX	FUSILADE II	Syngenta	fluazifop-p-butyl	A selective post-emergence herbicide for the control of annual and perennial grass weeds in non-bearing ornamentals and certain turf grasses.	16-24 oz/acre	Always add a surfactant at 1 qt/100 gallons of water. Do NOT use a crop oil concentrate when applying Fusilade II over ornamentals.
HOELON	ILLOXAN 3EC	Aventis	diclofop-methyl	A selective post-emergence herbicide for the control of goosegrass in bermudagrass. For use only in: AL, AR, FL, GA, LA, MS, NC, OK, SC, TN, and TX.	0.75-1.0 oz/ 1,000 sq. ft. 32.6-43.5 oz/ acre	Adding a surfactant at 1 qt/100 gallons may improve the control of goosegrass under less than optimum growing conditions.
SCEPTER	IMAGE 1.5LC	BASF	imaziquin	A selective post-emergence herbicide for the control of several important weeds in warm-season turfgrasses.	0.75-1.0 oz/ 1,000 sq. ft. 1-1.5 qts/acre	Add a surfactant at 1 qt/100 gallons after herbicide(s) have been mixed. An antifoam adjuvant may be added to the tank, if needed.
PERMIT	MANAGE	Monsanto	halosulfuron-methyl	A selective post-emergence herbicide for the control of nutsedge and other weeds in turfgrass.	2/3-1 1/3 oz by weight/acre No more than 2 applications/ season.	Use 1-2 qts of surfactant/100 gallons of water. Do NOT exceed 1 qt/100 gallons in high volume applications. Use only a surfactant with at least 80% active ingredients.
BUENO	MSMA SOLUBLE GRANULES	Lesco	monosodium acid methane arsonate	For selective post-emergent grassy weed and nutsedge control.	1.5 oz/1,000 sq. ft. Do NOT apply w/hose-end sprayer.	A surfactant may improve coverage on hard-to-wet grasses and nutsedge. Consult with manufacturer for specific recommendation.
PROWL	PENDULUM WDG	BASF	pendimethalin	For pre-emergence control of crabgrass, goosegrass, and most annual grasses plus certain broadleaves.	2.5-5 lbs/acre	The label does not recommend the addition of a surfactant, however, the use of an excellent spreader and wetter (such as an organosilicone surfactant) could improve coverage and contact with weed seeds. Check with the local manufacturer representative.
DUAL	PENNANT	Syngenta	metalochlor	For pre-emergence control of many annual grasses, certain broadleaf weeds and yellow nutsedge.	22-43 ml/1,000 sq. ft. 2-4 pts/acre	The label does not recommend the addition of a surfactant, however, the use of an organosilicone surfactant may improve penetration through heavy thatch. Check with the local manufacturer representative. The label stresses spray drift management, particularly in aerial applications on sod farm. Does not suggest a drift adjuvant.

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TURF PESTICIDE CHART

TURF PESTICIDE CHART

HERBICIDES

Herbicides (Ag Brand)	Herbicides (Turf Brand)	Manufacturer	Active Ingredient	Primary Use Application	Typical Use Rate	Adjuvant Recommendation
BASAGRAN	PROMPT 5L	TopPro (BASF)	bentazon	For post-emergence use on athletic fields, cemeteries, golf course fairways, industrial sites, parks, lawns, and sod farms. Controls mainly broadleaf weeds and sedges.	0.66-0.88 oz/ 1,000 sq. ft. 1.8-2.4 pts/acre	Add a crop oil concentrate at 0.75 oz/1,000 sq. ft. or 2 pts/acre. See label for checking suitability of crop oil concentrate by means of a jar test. Label says do NOT spray during windy conditions to avoid drift damage to adjacent sensitive plants.
REGLONE	REWARD	Syngenta	diquat dibromide	A non-selective post-emergence herbicide provides fast control of broadleaf and grassy weeds in industrial, golf course, recreational, commercial, and public areas. Avoid application to desirable plants.	For turf renovation: 1-2 pts/acre	Use a surfactant at 2 pts/100 gallons of water. The surfactant should contain 75% or greater of active ingredient.
RODEO	RODEO	Monsanto	glyphosate	A non-selective herbicide to control emerged aquatic weeds and brush.	3 qts-8 gal/100 gallons water See label for specific use rates.	Add surfactant at 2 qts/100 gallons if weeds are less than 6 inches tall and 2 or more qts/100 gallons if weeds are greater than 6 inches tall.
	CHIPCO RONSTAR 50WSP	Aventis	oxadiazon	A selective pre-emergence herbicide for control of annual grasses and broadleaf weeds in turf and ornaments.	4-6 lbs/acre Do NOT apply to newly seeded areas. Not for use on tees or putting greens.	Label does not recommend the addition of a surfactant.
ROUNDUP	ROUNDUP PRO	Monsanto	glyphosate	A complete broad-spectrum, post-emergence, non-selective herbicide for industrial, turf and ornamental weed control.	1-5 qts/acre. See label for specific use rates.	Product contains surfactant; no additional surfactant is needed. Label states to avoid spray drift, and does allow for the use of spray drift adjuvants.
SENCOR 4F	SENCOR 75 TURF	Bayer	metribuzin	For control of certain broadleaf and grass weeds in turf. To be applied on dormant and established bermuda grass. Do NOT apply to greens, tees, aprons, or other areas of closely mowed turf.	1/3-2/3 lbs/acre	Label makes no mention of adding a surfactant.
SURFLAN	SURFLAN AS	Dow AgroSciences	oryzalin	A selective pre-emergence surface applied herbicide for control of annual grasses and many broadleaf weeds in ornamentals and established warm season turf grasses.	1-1.5 oz/1,000 sq. ft. 1.5-2 qts/acre	Label does not recommend the addition of a surfactant.
	TRIMEC CLASSIC	PBI Gordon	2,4-D/dicamba/ mecoprop	A broad-spectrum post-emergence broadleaf weed control product. An amine formulation.	1.2-1.5 oz/1,000 sq. ft. 3-4 pts/acre: on cool season grasses	Addition of an organosilicone surfactant can improve coverage on hard-to-wet weeds. Check with manufacturer representative for usage and rates.
POAST	VANTAGE	ToPro (BASF)	sethoxydim	A selective post-emergence herbicide for control of annual and perennial grass weeds in turf, ornamentals, and non-crop, non-food areas.	0.8-1.4 oz/1,000 sq. ft. 2.25-3.75 pts/ acre	No additives or adjuvants are recommended for use with Vantage.

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TURF PESTICIDE CHART • TURF PESTICIDE CHART • TURF PESTICIDE CHART

TURF PESTICIDE CHART

INSECTICIDES

Insecticides (Ag Brand)	Insecticides (Turf Brand)	Manufacturer	Active Ingredient	Primary Use Application	Typical Use Rate	Adjuvant Recommendation
SPINTOR NATURALYTE and TRACEA NATURALYTE	CONSERVE SC	Dow Agrosciences	spinosad	For control of lepidopterous larvae infesting turf and ornamentals, plus certain beetles, thrips and leaf miners.	0.25-1.2 oz/1,000 sq. ft. 10-34 pts/acre	No adjuvants recommended.
LORSBAN	CHLORPYRIFOS PRO 2	Top Pro	chlorpyrifos	Controls insect pests indoors (households) and on turf and ornamental plants.	1.5-6 oz/1,000 sq. ft.	No adjuvants recommended.
	DELTA GARD GC 55C	Aventis	deltamethrin	A low dose rate broad-spectrum insecticide for general purpose insect control on golf courses, sod farms, landscape, and nursery ornamental plants. Restricted use pesticide.	0.2-0.9 oz/1,000 sq. ft. 8.75-39 oz/acre	The addition of an organosilicone surfactant may improve the control of some insects.
LORSBAN	DURSBAN PRO	Dow Agrosciences	chlopyrifos	For control of insect pests on turf and ornamental plants, and in and around residential and non-residential buildings and structures.	1.5-6 oz/1,000 sq. ft. 2-8 qts/acre	An oil may be added in certain dormant or delayed dormant tree applications. See label for specific uses.
KELTHANE 35W	KELTHANE T/O	Rohm and Haas	dicofol	A specific contact miticide for use on non-residential turf grasses, nurseries, ornamentals, flowers, and shade trees.	0.5-1 lb/100 gallons of water	Addition of a good spreader-sticker may be beneficial by improving coverage and resisting wash-off from foliage. Spray water pH should be buffered to 5 to 7 pH for optimum performance.
	MACH 2	Romid	halofenozide	Highly active on grubs and lepidopterous larvae in commercial turf grass sites (lawns, sod, turf areas). May be used as either a preventative or curative treatment.	1.5-2.2 oz/1,000 sq. ft. 2-3 qts/acre	A compatibility test is suggested before tank mixing with fluid fertilizers or other pesticides. A compatibility agent may be required if there are mixing problems.
ADMIRE	MERIT 75 WP	Bayer	imidacloprid	For foliar and systemic insect control in turfgrass and landscape ornamentals. Very effective on white grubs, billbugs, and annual bluegrass weevil in turf.	3-4 level teaspoons/1,000 sq. ft. 6.4-8.6 oz/acre	The label does not suggest the addition of a surfactant, however, a silicone-based surfactant can improve uptake of systemic insecticides. Check with the local manufacturer representative.
	NEMACUR 3	Bayer	fenamiphos	For control of nematodes on turfgrasses. Not for use on sod or commercial seed production. Not recommended for use on tees and greens.	9.7 oz/1,000 sq. ft. 3.3 gallons/acre Irrigate the treated area immediately after application.	
	OFTANOL 2	Bayer	isofenfos	A residual insecticide for the control of many surface feeding and soil insects attacking turf and ornamental plants.	3 oz/1,000 sq. ft. 1 gallon/acre	
ORTHENE 75W	ORTHENE TTO	Valent	acephate	For control of larvae and adult insects in turfgrass, lawns, trees, shrubs and ornamentals.	0.5-1.9 oz/1,000 sq. ft. 1.33-52. lbs/acre See label for rates on other applications.	A wetting agent may be required on difficult to wet foliage plants.

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TURF PESTICIDE CHART

INSECTICIDES

Insecticides (Ag Brand)	Insecticides (Turf Brand)	Manufacturer	Active Ingredient	Primary Use Application	Typical Use Rate	Adjuvant Recommendation
	SCIMITAR GS	Syngenta	lambda-cyhalothrin	An encapsulated pyrethroid insecticide providing quick action and residual insect control on turf and ornamental plants. Can be used on fairways, tees, greens, and aprons.	3.4-14 ml/1,000 sq. ft. 5-20 oz/acre. See label for use rates on ornamentals.	Addition of a spreader-sticker may enhance the control of insects on certain ornamentals having waxy, hard-to-wet foliage.
SEVIN 4F	CHIPCO SEVIN SL	Rhone-Poulenc	carbaryl	An extremely broad-spectrum contact insecticide for use on turf and ornamental plants.	1.5-6 oz/1,000 sq. ft. See label for use rates on ornamentals and other applications.	Addition of a spreader-sticker-extender may improve residual control. Check with manufacturer representative.
CAPTURE	TALSTAR GC FLOWABLE	FMC	bifentrhin	Controls a wide-spectrum of insects and mites on golf courses, trees, ornamentals, shrubs, flowers and other plants. Talstar GC is a restricted use product.	0.25-1 oz/1,000 sq. ft. 10-40 oz/acre	The label does not suggest the addition of a spreader-sticker or spreader-wetter.
BAYTHROID	TEMPO 2	Bayer	cyfluthrin	Effective against a broad-range of surface-feeding and foliar insects on commercial turf and ornamentals.	4-6 ml/1,000 sq. ft. 5.9-8.9 oz/acre	When spraying hard-to-wet ornamental foliage, the addition of a spreader-sticker may enhance both knock-down and residual activity. Do NOT allow spray drift onto pods, streams, or lakes. Spray drift adjuvant not suggested.
FICAM	TURCAM WP	Aventis	bendiocarb	Controls a wide-range of turf and ornamental pests including white grubs, chinch bugs, gypsy moths, webworms, etc. Turcam is a restricted use pesticide due to aquatic and avion toxicity.	0.5-1.5oz/1,000 sq. ft. See label for use rates on ornamentals.	Add a buffering adjuvant if spray water pH is 8.0 or greater.

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FUNGICIDES

Fungicides (Ag Brand)	Fungicides (Turf Brand)	Manufacturer	Active Ingredient	Primary Use Application	Typical Use Rate	Adjuvant Recommendation
	BANNER MAXX	Syngenta	fenoxycarb	Systemic fungicide for the control of dollar spot, summer patch, anthracnose, brown patch and other diseases on turf and ornamentals.	0.5-4 oz/1,000 sq. ft. 22-176 oz/acre	Tank mix combinations may require the use of a compatibility agent. The label suggests evaluating spray adjuvants prior to use.
	BANOL	Aventis	propamocarb hydrochloride	For preventative and curative control of pythium blight on turf and pythium and phytophthora on ornamentals.	1.33-2 oz/1,000 sq. ft. for preventative 3-4 oz/1,000 sq. ft. for curative	
BAYLETON 75 DF	**BAYLETON 50**	Bayer	triadimefon	Systemic fungicide for preventive and curative action on many fungal diseases on turf including: dollar spot, fusarium blight, summer patch, anthracnose, red thread, southern blight, take-all patch, and zoysia patch.	0.25-2 oz/1,000 sq. ft. 0.7-5.5 lb/acre	The label suggests evaluating spray adjuvants such as spreaders, extenders, etc., prior to use. Check with the manufacturer representative or university extension personnel.
ROVRAL	**CHIPCO 26019**	Rhone-Poulenc	iprodione	A foliar fungicide for prevention and control of: dollar spot, brown patch, large patch, fusarium blight, necrotic ring spot, leaf spots, redthread, pink snow mold, and gray snow mold.	1.5-4 oz/1,000 sq. ft.	The label states do not mix with any sticker, extender or wetting agent.
A;OETTE	**CHIPCO ALIETTE SIGNATURE**	Rhone-Poulenc	fosetyl-aluminum	A systemic fungicide for control of pythium disease and yellow turf.	4-8 oz/1,000 sq. ft. Do NOT combine with Daconil 2787 or Fore, due to incompatibility!	Do NOT mix with any sticker, extender, or wetting agent.
TOPSIN	**CLEARY'S 3336-F**	W.A. Cleary	thiophanate	A flowable systemic fungicide for prevention and control of turf diseases such as: dollar spot, brown patch, anthracnose, summer patch, stripe smut, pink snow mold, and many others.	1-10 oz/1,000 sq. ft. See label for preventative and curative rates.	
RONILAN	**CURALAN DF**	BASF	vinclozolin	A contact fungicide for prevention and curative disease control of: anthracnose, brown patch, dollar spot, fusarium patch, pink and gray snow mold, leaf spots, melting out, pink patch and red thread.	1-2 oz/1,000 sq. ft.	The label suggests adding a wetting agent to ensure good coverage and achieve consistent disease control.
DITHANE DF	**DITHANE DF T&O**	Rohm and Haas	mancozeb	A contact fungicide for prevention and control of: melting out, rust, copper spot, fusarium blight, red thread, slime mold, algae, dollar spot, rhizoctonia, brown patch, pythium blight, and fusarium snow mold.	4-8 oz/1,000 sq. ft.	The label suggests the addition of a surfactant to provide more uniform coverage and improved deposition for optimum fungicide performance. A spreader-sticker would be the ideal surfactant of choice for this application.
NOVA	**EAGLE**	Rohm and Haas	myclobutanil	A systemic turf fungicide providing curative and protective activity on: anthracnose, red thread, septoria leaf spot, brown patch, copper spot, zonate leaf spot, dollar spot, fusarium blight, fusarium patch, pink snow mold, leaf spot, necrotic ring spot, powdery mildew and rusts.	0.6-1.2 oz/1,000 sq. ft.	The label indicates that spray adjuvants are compatible but has no specific recommendation for their use. Generally, an organosilicone surfactant works particularly well with systemic fungicides or insecticides.

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TURF PESTICIDE CHART

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FUNGICIDES

Fungicides (Ag Brand)	Fungicides (Turf Brand)	Manufacturer	Active Ingredient	Primary Use Application	Typical Use Rate	Adjuvant Recommendation
DITHANE 4F	**FORE FLO XL**	Rohm and Haas	mancozeb	A contact protectant turf fungicide with broad spectrum control. Provides excellent control against all major turf diseases including brown patch and pythium.	6.4-12.8 oz/ 1,000 sq. ft. 0.8-4.8 qts/acre	The label indicates that the addition of a surfactant (spreader-sticker) will improve fungicide performance.
QUADRIS	**HERITAGE**	Syngenta	azoxystrobin	A fungicide with both contact and systemic activity. Only fungicide with activity against both rhizoctonia spp. and pythium spp. Plus good activity against most other major turf diseases. Does NOT control dollar spot.	0.2-0.7 oz/1,000 sq. ft. 0.5-1.9 lb/acre	The label states to not combine with surfactants, etc., unless compatibility and effectiveness have been determined prior to use. An organosilicone surfactant would be a primary choice to evaluate with the contact and systemic properties of Heritage. Spray drift management is emphasized but spray drift adjuvants are not mentioned.
FOLISTAR	**PROSTAR 70 WP**	Aventis	flutolanil	A systemic fungicide for control of turf diseases such as: rhizoctonia brown patch, pythium blight, fairy ring, pink snow mold, gray snow mold, red thread and pink patch, yellow patch, and large brown patch.	1.5-4.5 oz/1,000 sq. ft.	The label suggests use of a surfactant for best results. An organosilicone would be most effective with a systemic fungicide. Check with the local manufacturer representative.
	PROTECT T/O WSB	W. A. Cleary	mancozeb	A contact fungicide effective against: dollar spot, brown patch, pythium blight, pink snow mold, leaf spot, and algae. Also effective on a range of ornamental diseases.	4-8 oz/1,000 sq. ft.	A spreader-sticker would provide improved coverage, deposition and rainfastness for consistent performance.
RUBIGAN EC	**RUBIGAN AS**	Dow Agrosciences	fenarimol	A locally systemic fungicide for the control of specific diseases on turfgrasses and ornamentals. Controls: dollar spot, copper spot, powdery mildew, necrotic ring spot, patch diseases, fusarium blight, pink and gray snow mold and red thread on turf.	0.75-8 oz/1,000 sq. ft. See label for curative and preventative use rates.	The label does not suggest the addition of a surfactant. Check with the local manufacturer representative for consideration in adding a surfactant.
	SENTINEL 40 WG	Syngenta	cyproconazole	A broad spectrum systemic turf fungicide for control of diseases on golf courses and sod farms. Has curative and preventive activity.	0.16-0.33 oz/ 1,000 sq. ft.	
RIDOMIL GOLD	**SUBDUE MAXX**	Syngenta	mefenoxam	A systemic fungicide providing control of: pythium blight, yellow turf, downy mildew and pythium damping off on established and newly seeded turf.	0.5-1 oz/1,000 sq. ft.	The label does not mention nor recommend the addition of a surfactant. Check with the local manufacturer representative.
BRAVO	**DACONIL WEATHER STIK**	Syngenta	chlorothalonil	A contact fungicide for use on golf course tees, greens, fairways, and ornamentals. Controls: anthracnose, brown patch, dollar spot, copper spot, gray leaf spot, leaf spot, gray snow mold, red thread, stem rust and others on turf grasses.	2 1/8-16 oz/ 1,000 sq. ft. 2 3/4-16 2/3 pts/acre	The label states to not combine with surfactants or fertilizers unless prior use has shown the compatible, effective and non-injurious.

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absorption-A process in which one material (the absorbent) takes in and retains another (the absorbate).

acaracide-A chemical agent used to kill mites.

acidifier-A material that can be added to spray mixtures to neutralize alkaline solutions and lower pH.

activator-A material that increases the biological efficacy of agrichemicals.

active ingredient-A component of the formulation that produces a specific effect for which the formulation is designed.

adjuvant-A material added to a tank mix to aid or modify the action of an agrichemical, or the physical characteristics of the mixture.

anionic surfactant-A surface-active agent in which the active portion of the molecule containing the lipophilic segment forms exclusively a negative ion (anion) when placed in aqueous solution.

antifoaming agent-A material used to inhibit or prevent the formation of foam.

buffering agent-A compound or mixture that, when contained in solution, causes the solution to resist change in pH. Each buffer has a characteristic limited range of pH over which it is effective.

cationic surfactant-A surface-active agent in which the active portion of the molecule containing the lipophilic segment forms exclusively a positive ion (cation) when placed in aqueous solution.

compatability agent-A surface active agent that allows simultaneous application of liquid fertilizer and agrichemical or two or more agrichemical formulations, as a uniform tank mix, or improves the homogeneity of the mixture and the uniformity of the application.

crop oil concentrate-An emulsifiable petroleum oil-based product containing 15 to 20% w/w surfactant and a minimum of 80% w/w phytobland oil.

defoaming agent-A material that eliminates or suppresses foam in the spray tank.

defoliant-A chemical that causes the foliage to drop from plants.

deposition aid-A material that improves the ability of agrichemical sprays to deposit on targeted surfaces.

dessicant-A desiccant is a substance that absorbs water. It is most commonly used to remove humidity that would normally degrade or even destroy products sensitive to moisture. Silica gel, calcium sulfate, montmorillonite clay, and molecular sieves are commonly used as desiccants.

drift control agent-A material used in liquid spray mixtures to reduce spray drift.

emulsifier-A surfactant that promotes the suspension of one immiscible liquid in another.

fertilizer-Any of a large number of natural and synthetic materials, including manure and nitrogen, phosphorus, and potassium compounds, spread on or worked into soil to increase its capacity to support plant growth.

foam-A thick chemical froth.

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foaming agent-A material that increases the volume or stability of the foam formed in a spray mixture.

fungicide-A chemical substance that destroys or inhibits the growth of fungi.

glyphosate-A white compound, $C_3H_8NO_5P$, that is soluble in water, used as a broad-spectrum herbicide.

herbicide-A chemical substance used to destroy or inhibit the growth of plants, especially weeds.

insecticide-A chemical substance used to kill insects.

methylate-To mix or combine with methyl alcohol.

methylated seed oil-A group of specially refined crop oil concentrates derived from a seed oil crop such as cotton, soybean, sunflower, or rape.

micronutrient-A substance, such as a vitamin or mineral, that is essential in minute amounts for the proper growth and metabolism of a living organism.

nonionic surfactant-A surface-active agent having no ionizable polar end groups but comprised of hydrophilic and lipophilic segments.

penetrant-A material that enhances the ability of an agrichemical to enter a substrate or penetrate a surface.

pesticide-A chemical used to kill pests, especially insects.

pH-A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity. The pH scale commonly in use ranges from 0 to 14.

silica-An inorganic compound composed of silicon and oxygen. It is a very high melting solid that is insoluble in water. In commerce, silica is a fine, white powder. Also known as silicon dioxide.

spreader-A material which increases the area that a droplet of a given volume of spray mixture will cover on a target.

spreader-sticker-A material that has the properties of both a spreader and a sticker.

sticker-A material that assists the spray deposit to adhere or stick to the target and may be measured in terms of resistance to time, wind, water, mechanical action, or chemical action.

surface tension-A property of liquids arising from unbalanced molecular cohesive forces at or near the surface, as a result of which the surface tends to contract and has properties resembling those of a stretched elastic membrane.

surfactant-A material that improves the emulsifying, dispersing, spreading, wetting, or other surface-modifying properties of liquids.

vegetable oil-Oil extracted from seeds; typically those of corn, cotton, peanut, rapeseed, sunflower, canola, or soybean.

vegetable oil concentrate-An emulsifiable vegetable oil product containing 5 to 20% w/w surfactant and a minimum of 80% w/w vegetable oil.

wetting agent-A substance that reduces the surface tension of a liquid, causing the liquid to spread across or penetrate more easily the surface of a solid.

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NOTICE-READ CAREFULLY

CONDITIONS OF SALE, LIMITED WARRANTY, AND LIMITATIONS OF LIABILITY AND REMEDIES

Read the Conditions of Sale – Warranty and Limitations of Liability and Remedies before using this product. If the terms are not acceptable, return the product, unopened, and the full purchase price will be refunded. The directions of this label are believed to be reliable and should be followed carefully. Insufficient control of pests and/or injury to crop to which the product is applied may result from the occurrence of extraordinary or unusual weather conditions or the failure to follow the label directions or good application practices, all of which are beyond the control of KALO, Inc., the manufacturer or seller. In addition, failure to follow label directions may cause injury to crops, animals, workers or the environment. The Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purpose referred to in the directions for use subject to the factors noted above which are beyond the control of the Company. The Company makes no other warranties or representations of any kind express or implied concerning the product, including no implied warranty of merchantability or fitness for any particular purpose, and no such warranty shall be implied by law. The exclusive remedy against the Company for any cause of action relating to the handling or use of this product shall be limited to, at KALO, Inc.'s election, one of the following:

1. Refund of the purchase price paid by buyer or user for product purchased, or,
2. Replacement of the product used

To the extent allowed by law, the Company shall not be liable and any and all claims against the Company are waived for special, indirect, incidental, or consequential damages or expense of any nature, including, but not limited to, loss of profits or income. The Company, the manufacturer and seller offer this product and the buyer and user accept it, subject to the foregoing conditions of sale and limitation of warranty, liability and remedies.

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