



AQUA·AID

PRODUCT CATALOGUE



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Surfactants

THE MULTI-BRANCH REGENERATING AND OARS TECHNOLOGY

Aqua Aid offers an extensive range of surfactant products for the professional turf industry. These surfactants can be split up into 2 major categories, state-of-the-art 3-D surfactants and conventional surfactants.

The 3-D surfactant range consists of the most advanced surfactants in the market. These surfactants are backed up with various independent research and have field-proven results for numerous of years by the end users. The multi-branch regenerating and OARS technologies both hold different patents.

Multi-branch regenerating technology

Multi-branch regenerating technology is completely different to other technologies that are currently used in the professional turf market. The difference between them and the traditional linear co-block polymer molecules is that they are much higher in molecular weight and have multiple interactive sites (6 or 8 sites). Therefore each branch is a wetting agent by itself. This branching will increase the interaction between the surfactant and the soil, which will cause very consistent moisture levels

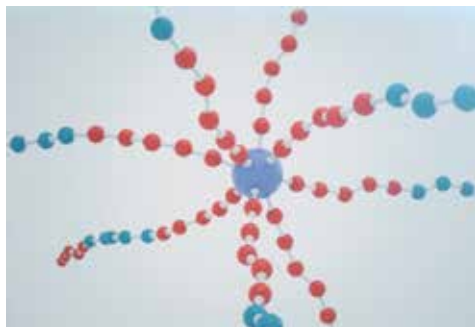
within the treated surface. The combination of the higher molecular weight and branching will positively affect the biodegradation of the product. When one branch is removed by biodegradation, a new lower molecular weight surface active species is regenerated. This will continue to manage the water in the soil.

Multi-branch regenerating technology is incorporated in all of our 3-D surfactants and will reduce hydrophobic conditions on a sustainable basis. Independent research has shown that the surfactants are able to reduce water use of over 30% while maintaining high turf quality.

Products: OARS HS, OARS PS, PBS150.

OARS technology

Another Aqua Aid patented technology is the OARS technology. OARS stands for Organic Acid Redistribution System. The OARS technology controls soil water repellency by dissolving the dried organic acid layer of the soil colloid. This dried out organic acid layer will form a wax layer on the soil colloid, making these colloids hydrophobic, being the main reason



Multi-branch regenerating technology



Co-block polymer

for Localized Dry Spots (LDS).

Other wetting agents mask the problem by heavily wetting the soil but not removing the acid layer on the colloids. Therefore the soil colloids will remain hydrophobic. After using the OARS technology the soil will become hydrophilic again. The OARS

technology is patented and backed up by independent research.

Products:

OARS HS, OARS PS, OARS Liquid, OARS Pellets.



Hydrophobic coating



Clean sand particle

3D SURFACTANTS

OARS HS:

A hydrating surfactant that includes the multi-branch regenerating and OARS technology.

OARS PS and OARS PS Granular:

A penetrating surfactant that also includes both technologies.

PBS-150 and PBS-150 Granular:

Long lasting hydrating soil surfactants that consist of 100% multi-branch regenerating technology.

CONVENTIONAL SURFACTANTS

OARS Liquid:

The corrective approach to managing water repellency.

Aquifer:

A co-block polymer based omnidirectional hydrating surfactant.

Aqua Aid:

A very cost-effective penetrant formulated with high quality grade non-ionic surfactants.

FWY-ISP:

A unique injectable soil penetrant designed to cover large surfaces.

COMBINATION

Hydra30^{Plus}: Improving the overall moisture management within agronomic programs. **Hydra30^{Plus}** is a combination of the 3D and 2D surfactant.

Next to the sprayable surfactants mentioned, Aqua Aid also offers a range of hand water **pellets** in the **PROportioner System**. These pellets are available in 4 different products, all with their own characteristics.

OARS HS

SOIL HYDRATING SURFACTANT

OARS HS, Soil Hydrating Surfactant, is a combination of the university researched, field proven, and patented organic acid redistribution system (OARS) with a multi-branched hydrating chemistry. **OARS HS** controls soil water repellency while providing uniform soil moisture and increased soil moisture retention.

- Removes humic coatings from hydrophobic soil particles.
- Controls water repellency.
- Hydrates the soil to improve moisture retention.
- Reduces drought stress and LDS.
- Consistent performance between applications to maintain adequate moisture in hard to wet soils.

DIRECTIONS FOR USE

Apply 13-16 L/Ha at 30 day interval. After an initial 16 L application, follow up with 13 L/Ha with an interval of 4-6 weeks or as needed.

Drought conditions can best be managed by applying 6-8 L/Ha at 15 day intervals. For extreme drought conditions with high temperatures and/or increased soil water repellency, apply 20-25 L/Ha in 800 L of water at 30 day intervals. Irrigate with sufficient water to deliver OARS HS to the soil profile, 3 mm or more is recommended.

Available in packaging of 20 L, 208 L and 1000 L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

COMPOSITION:

Octahydroxy polyoxyalkylene polymers:	85.0%
Amine salt of alkly substituted maleic acid:	7.5%
Inert ingredients:	7.5%

Evaluation of 2 commercially available wetting agents on soil moisture management

Evaluation Time Frame: April 15, 2017 to July 14, 2017, 91 Days

Location: Penn State University, Berks Campus Agricultural Research Center, PA, USA

Treatments:

Trials were conducted on potted containers with a soil consistency of 70% sand and 30% soil planted with L-93 creeping bentgrass. Applications were made at label recommendations. Two applications of OARS HS multi-branched regenerating surfactant were made at 16 L/Ha. Two applications of an industry leading modified/methyl-capped block copolymer surfactant were made at 19 L/Ha.

Evaluation:

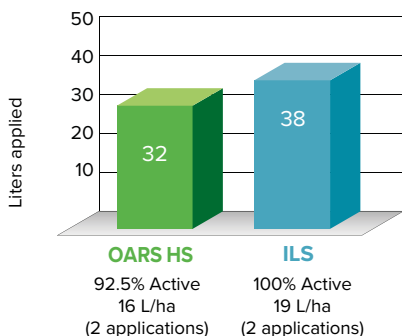
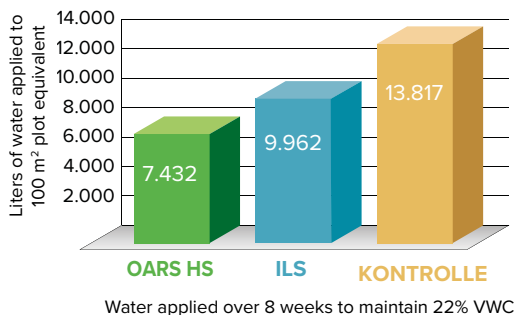
Evaluation of OARS HS multi-branched regenerating surfactant and an industry leading modified/methyl-capped block copolymer surfactant on soil moisture management of L-93 creeping bentgrass grown in a 70/30 sand to soil mix in potted containers. Target moisture level was 22% Volumetric Water Content (VWC). Rewetting of the matrix occurred once 15% VWC was measured. Both measurements were completed using a Spectrum TDR 300 Moisture Meter. The dry down was initiated on May 19, 2017.

Conclusion:

OARS HS plots required 46% less water than the control plots maintained at 22% VWC. 46% Less water is equivalent to 6,450 m³ saved for 10 ha of fairways in an 8 week period. OARS HS outperformed the industry leading surfactant by saving 25% more water and required less watering cycles than the control plots.

Effect of OARS® HS on Soil Volumetric Water Content (VWC) versus an Industry Leading Surfactant (ILS)

25% Water Savings over ILS with 16% Less Applied Product
46% Water Savings over Control



* Trials performed by Penn State University 2017

OARS PS

SOIL PENETRATION SURFACTANT

OARS PS, Soil Penetrating Surfactant, is a combination of the university researched, field proven and patented Organic Acid Redistribution System, OARS, and multi-branched penetrating chemistry. It controls soil water repellency while providing uniform soil moisture for a longer period of time. **OARS PS** will retain water lower in the soil profile, creating firmer and faster playing surfaces.

OARS PS is available in liquid and granular form.

- Removes humic coatings from hydrophobic soil particles.
- Increases penetration of water.
- Provides firm, fast surfaces.
- Improves water management efficiency.
- Controls soil water repellency / reduces LDS.
- Shows longer lasting activity.

DIRECTIONS FOR USE

Liquid: Apply 13-16 L/ha at 30 day interval. After an initial 16 L application, follow up with 13 L/ha with an interval of 4-6 weeks or as needed.

Difficult to manage areas will respond best by applying 6-8 L/ha at 15 day intervals. For increased surface firmness, apply 20-25 L/ha at 30 day intervals. Irrigate with sufficient water to bring **OARS PS** into the soil profile, 3 mm or more is recommended.

Granular: Apply **OARS PS Granular** at 160-240 KG/ha at 4-6 weeks interval. Wash in at 3 mm irrigation for best result. Function and longevity depend on profile conditions and climatic influences. Monitor moisture levels to check on product activity before reapplication. **OARS PS Granular** can be used all year round, even in autumn and winter, where it can help to reduce moisture levels in topsoils.

Available in packaging of 20 L, 208 L and 1000 L and 20 kg bags. Weight to volume equivalents for OARS PS Granular formulation: 160 KG = 10 L of OARS PS Liquid.

Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

COMPOSITION:

Active ingredient:

Hexahydroxy polyoxyalkylene polymers:	85.0%
Amine salt of alkyl substituted maleic acids:	7.5%
Water:	7.5%

Winter hydration of greens with OARS PS

Adam Van Dyke, M.S., Professional Turfgrass Solutions LLC.

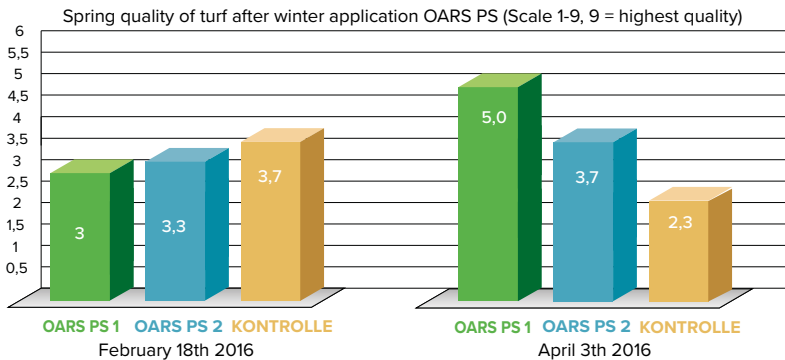
Evaluation Time Frame: November 2015 - April 2016

Location: The Ridge Golf Course in Salt Lake City, UT, USA

Treatments:

The study aimed to investigate the effects of winter applications of OARS PS on water repellency and water retention of greens in spring, as well as the quality and colour of turf and any changes in playing surface firmness. The study was conducted on a putting green, from November 2015 to April 2016. OARS PS was applied before and after snow cover, and the effects were compared to an untreated control. Water repellency was measured using water droplet penetration tests, and moisture retention was measured using a dielectric permittivity probe. The playing surface firmness was measured using a TruFirm impact hammer, and turfgrass quality and colour were visually assessed and measured using a chlorophyll meter.

The results showed that OARS PS significantly improved wettability of the playing surface during winter and reduced water repellency deeper in the rootzone. It also had a positive effect on turfgrass quality and color, but did not significantly affect playing surface firmness.



OARS PS 1: Pre & Post-snow application (nov 22 2015 & feb 18 2016)
 OARS PS 2: Pre-snow application (nov 22 2015)



Untreated (left) had more localized dry spot symptoms develop in spring, while making two applications of OARS PS in winter (right) lessened localized dry spot symptoms resulting in better turf quality



MULTI-BRANCHED LONG-TERM SURFACTANT

PBS150 is a long-term surfactant utilizing a unique multi-branched surfactant molecular structure to address the source of performance loss – biodegradation of the surfactant molecule by soil microbes. This increased performance can reduce hydrophobic conditions on a sustainable basis for up to 150 days. It can also restore the uniform movement of water into and through the soil profile. When used in accordance with product directions, **PBS150** is easy to use, not harmful to plants and can be applied at anytime of the year to avoid the detrimental impact of water repellency stress and localized dry spots. **PBS150** is also available as **PBS150 Granular** for more application flexibility. **PBS150 granular** is based on the same chemistry, coated on a porous ceramic carrier.

- Reduces hydrophobic conditions on a sustainable basis.
- Encourages a pattern of hydration and re-hydration that improves the amount of available water in the soil profile to meet the metabolic demands of the plant.
- Restores the uniform movement of water into and through the soil matrix.
- Improves stress tolerance.
- Reduces water use up to 30%.
- Increases longevity up to 5 months.

DIRECTIONS FOR USE

Liquid: Apply 16-25 L/ha repeat after 14 days for a 150 day program. Re-apply after 150 days from last treatment, or as needed, if climatic conditions still exist for the formation of water repellency conditions.

Granular: PBS150 Granular at 160-240 kg/ha at 6 - 10 weeks interval.

Available in packaging of 20 L, 208 L, 1000 L and 20 kg bags. 160 kg of PBS150 Granular equals 10 L of PBS150 Liquid.

Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

COMPOSITION:

PBS150 Liquid

Active: Octahydroxy polyoxyalkene polymers: 100%

PBS150 Granular

Active: Octahydroxy polyoxyalkene polymers: 6.25%

Inert: Porous ceramic carrier: 93.75%

Evaluation of 2 commercially available wetting agents on soil moisture management

Evaluation Time Frame: March 30, 2016 to August 8, 2016, 132 Days

Location: Penn State University, Joseph E. Valentine Turfgrass Research Center, PA, USA

Treatments:

Trials were conducted on native soil fairways. Applications were made at label recommendations. 3 Applications of PBS150 multi-branched regenerating surfactant were made at 16 L/ha. 3 Applications of an industry leading modified/methyl-capped block copolymer surfactant were made at 19 L/ha.

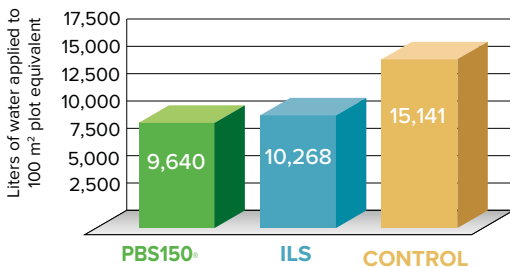
Evaluation:

Evaluation of PBS 150 multi-branched regenerating surfactant and an industry leading modified/methyl-capped block copolymer surfactant on soil moisture management of an L-93 creeping bentgrass grown on a native soil fairway. Target moisture level was 35% Volumetric Water Content (VWC). Rewetting of the matrix occurred once 25% VWC was measured. Both measurements were completed using a Spectrum TDR 300 Moisture Meter. The dry down was initiated on June 8, 2016.

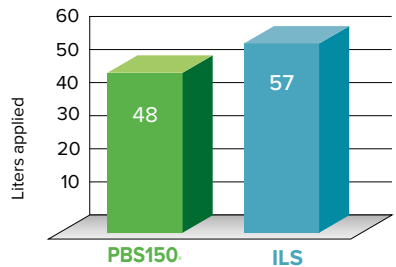
Conclusion:

PBS150 plots required 36% less water than the control plots maintained at 35% VWC. 36% Less water is equivalent to 5,565 m³ saved for 10 Ha of fairways in an 8 week period. PBS150 outperformed the industry leading surfactant by saving 6% more water and required less watering cycles than the control plots.

Effect of PBS150® on Soil Volumetric Water Content (VWC) versus an Industry Leading Surfactant (ILS)
 6% Water Savings over ILS with 16% Less Applied Product
 36% Water Savings over Control



Water applied over 8 weeks to maintain 35% VWC



92.5% Active
 16 L/ha
 (3 applications)

100% Active
 19 L/ha
 (3 applications)

GREENS PROGRAMS

Dial-In™ Program

The Dial-In™ program with **OARS HS** and **OARS PS** puts the control of moisture management in the turf manager's hand. Greenkeepers can customize their moisture management program by adjusting the ratios of **OARS HS** and **OARS PS** to meet the demands from weather, cultural practices, daily play and tournaments. Unique to **OARS PS** & **OARS HS** is the possibility to mix them together in a tank and customize the ratio without increasing the total volume of product used.

OARS HS, Soil Hydrating Surfactant, is a combination of the patented organic acid redistribution system (**OARS**) with a multibranched hydrating chemistry.

OARS PS, Soil Penetrating Surfactant, is a combination of the patented organic acid redistribution system (**OARS**) with a multibranched penetrant chemistry.

ENHANCED GREENS PROGRAMS

The multi-branched regenerating surfactant chemistry creates great delivery tools for soil amendments. AQUA AID continues to conduct field research on both surfactant chemistries and **Turf Power**. The addition of **Turf Power** to your surfactant program has many plant health benefits including:

- Increased root growth in length and mass, stress tolerance, and plant vigor.
- Improved nutrient efficiency.
- Improved drought tolerance.

Tankmix OARS HS + Turf Power, Soil Hydrating Surfactant, is a combination of the patented organic acid redistribution system (**OARS**) with a multibranched hydrating chemistry.

Tankmix OARS PS + Turf Power Soil Penetrating Surfactant, is a combination of the patented organic acid redistribution system (**OARS**) with a multibranched Penetrant chemistry.

FAIRWAYS, TEES AND ROUGHS PROGRAM

PBS150 is a long-term surfactant utilizing the unique multi-branched regenerating molecular structure to address the source of performance loss – biodegradation of the surfactant molecule by soil microbes. **PBS150** sustains a longer uniform soil moisture profile.

Hydra-30^{Plus} is formulated to allow greenkeepers the ability to improve the overall moisture management within agronomic programs. **Hydra-30^{Plus}** improves overall root zone moisture by restoring uniform hydration throughout the root zone across a variety of soil types.

Programmed approach to soil moisture management

Initial application rate (Per 1.0 Ha)	In-season application rate (Per 1.0 Ha)	Application timing	Watering recommendations
16 liter	6.5 liter	14 days	Irrigate with sufficient water to deliver OARS HS into the soil profile, 3 mm or more is recommended.
16 liter	13 liter	30 days	

16 liter	6.5 liter	14 days	Irrigate with sufficient water to deliver OARS PS into the soil profile, 3 mm or more is recommended.
16 liter	13 liter	30 days	

* In-season apps begin 2 weeks after initial application

Initial application rate (Per 1.0 Ha)	In-season application rate (Per 1.0 Ha)	Application timing	Watering recommendations
16 L OARS HS + 50 L Turf Power	6.5 L OARS HS + 25 L Turf Power	14 days	Irrigate with sufficient water to deliver OARS HS into the soil profile, 3 mm or more is recommended. Irrigate off the leaf blade immediately. Water in with OARS HS at night.
16 L OARS HS + 50 L Turf Power	13 L OARS HS + 50 L Turf Power	30 days	

16 L OARS PS + 50 L Turf Power	6.5 L OARS PS + 25 L Turf Power	14 days	Irrigate with sufficient water to deliver OARS PS into the soil profile, 3 mm or more is recommended. Irrigate off the leaf blade immediately. Water in with OARS PS at night.
16 L OARS PS + 50 L Turf Power	13 L OARS PS + 50 L Turf Power	30 days	

* In-season apps begin 2 weeks after initial application

Initial application rate (Per 1.0 Ha)	Application timing	Watering recommendations	
100 Day Program (2x) 16 L PBS150	150 Day Program (3x) 16 L PBS150	15 days apart	Irrigate with sufficient water to deliver PBS150 to the soil profile, 3 mm or more recommended.
10 L Hydra-30 ^{Plus}	30 days	Irrigate with sufficient water to deliver Hydra-30^{Plus} to the soil profile, 3 mm or more recommended.	



ORGANIC ACID REDISTRIBUTION SYSTEM

Research has proven that water repellency and LDS are caused by the buildup of organic acids (humic substances) in the top one inch below the thatch/soil interface. These organic acids are the result of dead plant material that builds up over a short period of time. Before the discovery of **OARS**, the only way to manage these organic acids was to mask their affect with a hydrating surfactant. Because turf is aggressive and continually growing, the buildup of organic acids is also continual. **OARS'** unique combination of a hydrating surfactant and organic acid solubilizer is the only chemistry that addresses water repellency at the cause. **OARS** is the corrective approach to managing water repellency. Unlike other surfactants and soil amendments that only alleviate the symptoms of soil water repellency, **OARS** solubilizes the built-up hydrophobic organic substances, allowing them to be flushed from the soil particle surface and provides 30 days of hydration.

- Removes organic coatings from hydrophobic soil particles.
- Uniform movement of water into and through the soil profile.
- 30 day deep hydrating surfactant.
- Creates a dryer playing surface.
- Curative effect on Type II fairy ring.

DIRECTIONS FOR USE

Apply 13-16 L/Ha at 30 day interval. After an initial 16 L application, follow up with 13 L/Ha with an interval of 4-6 weeks or as needed.

In combination with OARS HS & PS start the season with initial application of 25 L/ha OARS Liquid and follow up with a combined program of HS & PS depending on local climatic conditions, 2-4 weeks after application of OARS Liquid.

Available in packages of 20 L, 208 L and 1000 L or as PROportioner pellets.

Please check availability with your distributor

COUNTRY OF ORIGIN: USA

COMPOSITION:

Polyoxyalkylene polymers:	80%
Potassium salt of alkyl substituted maleic acid:	10%

Can wetting agents remove sand particle organic coatings that cause soil water repellency?

Location: Turf Research Facility at the University of Missouri in Columbia, MO, USA

Result:

According to the study, the primary management tool for controlling soil water repellency is wetting agents that contain both hydrophobic and hydrophilic groups in their molecules. The study aimed to investigate whether selected wetting agents could remove hydrophobic organic coatings from sand surfaces. The commercial compound OARS (organic acid removal system; Aqua-Aid), which contains 80% polyoxyalkylene polymers and 10% potassium salt of alkyl substituted maleic acid, claims to remove organic coatings from the hydrophobic sand surface. The study found that OARS was **effective** in removing hydrophobic organic coatings from sand surfaces, which cause soil water repellency. Removal of the organic coatings can ultimately reverse the soil's water-repellent condition.

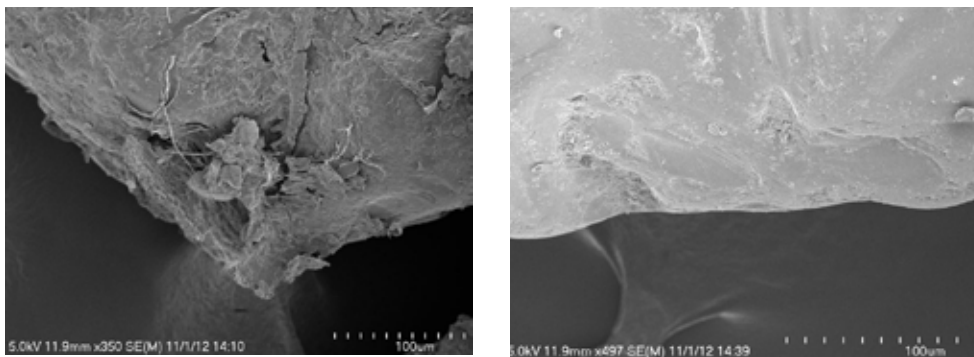


Figure 1. Representative scanning electron microscopy images of hydrophobic sand (left) and a clean sand grain that has never been used. Scales in micrometers (10^{-6} meter) are on the lower right corner of each image. Note the layers of organic coatings on the sand grain on the left and the clean surface on the sand grain on the right. The hydrophobic sand grain was collected from a 7-year-old USGA green, where localized dry spot has been documented. The hydrophobicity level was determined to be severe based on the water droplet penetration test, which had a result of $>2,500$ seconds. Photos by Enzhan Song.

Hydra-30 Plus™

HYDRATION SURFACTANT

Hydra 30^{Plus} is formulated to allow turf managers the ability to improve the overall moisture management within agronomic programs. **Hydra 30^{Plus}** improves overall root zone moisture by restoring uniform hydration throughout the root zone across a variety of soil types. To better handle the stresses of modern maintenance practices, **Hydra 30^{Plus}** also contains a vitamin package to aid turf in combating stress and help speed recovery when stress is evident. **Hydra 30^{Plus}** provides the turf manager with application flexibility, visual results, and cost effectiveness while achieving firm turfgrass surfaces.

- Restores hydration uniformity across a variety of soil types.
- Provides a key vitamin package.
- Combats turf stress and aids in recovery.
- Increases infiltration.
- Decreases water usage.
- Proves to be an economical solution.

DIRECTIONS FOR USE

Apply 10 L/ha in 800 L at 30 day intervals or as needed. Irrigate with sufficient water to deliver **Hydra 30^{Plus}** into the soil profile, 3 mm or more is recommended. Inject 7-10 L/ha at 30 day intervals or as needed.

Available in packages of 20 L, 208 L and 1000 L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

COMPOSITION:

Hydroxy polyoxyalkylene polymers:

60%

Inert ingredients:

40%

Aquifer®

30 - 45 DAYS HYDRATOR

Aquifer has a unique characteristic of producing downward and lateral movement of water (omnidirectional), which provides a uniform moisture profile throughout the soil structure for up to 45 days. This allows not only water but also nutrients to be distributed evenly through the root zone. The end result is less summer stress, reduced wilt, less localized dry spots, improved rewetting capability and improved plant performance.

Aquifer is a non-ionic and environmentally safe formulation of soil surfactants that will not burn and does not have to be watered in direct after application. **Aquifer** is ideal for dry, compacted and hydrophobic soils and has been designed to work in conjunction with a good water management program, injected through either irrigation systems and/or tank mixed for spray application.

- Reduces localized dry spots.
- Reduces wilt and summer stress.
- Increases water retention.
- Realizes a uniform moisture soil profile.

DIRECTIONS FOR USE

Apply 13-16 L/ha at 30 to 45 day intervals. Irrigate with sufficient water to deliver Aquifer in to the soil profile, 3 mm or more is recommended.

Available in packages of 20 L, 208 L and 1000 L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

COMPOSITION:

Active Ingredient:

Propoxylated polyethylene glycols:

99%



15 - 30 DAYS PENETRANT

Aqua Aid liquid penetrant is formulated with a high quality of cosmetic grade non-ionic surfactants and wetting agents. This unique water based formulation of surfactants and wetting agents allows application any time of the year with no phytotoxicity.

Aqua Aid provides superior infiltration of water into the soil profile by modifying the water surface tension. This can reduce the required amount of irrigation and rain water. The end result is less hand watering, less maintenance expense, and a healthier plant. **Aqua Aid** is an environmentally safe premium wetting agent that is ideal for turf, agricultural, and horticultural applications.

- Reduces water tension.
- Reduces water usage.
- Increases nutrient uptake.
- Increases water penetration.
- Helps to leach harmful salts.
- Is compatible with most tank sprays.
- Reduces costs.

DIRECTIONS FOR USE

For tank application: mix 6-13 L/ha. Apply 2 applications the 1st month at 15 day intervals. Repeat with 6-13 L/ha at 30 day intervals throughout the growing season.

For injection application: inject 3-10 L/ha. Apply 2 applications the 1st month at 15 day intervals. Repeat with 3-5 L/ha at 15 day intervals throughout the growing season.

Available in packages of 20 L, 208 L and 1000 L.

Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

COMPOSITION:

Non-ionic polyols:

19%

Inert ingredients:

81%



FAIRWAY INJECTABLE SOIL PENETRANT

FWY-ISP is a cost effective formulation of soil wetting agents designed to enhance the penetration and infiltration of applied water through irrigation systems. **FWY-ISP** is designed to treat water repellent areas and large wilted areas in fairways and mounds, as well as hard to drain areas. **FWY-ISP** can also be incorporated into nutrient mixes to allow for more efficient delivery of applied nutrients.

FWY-ISP is compatible with all conventional irrigation systems or conventional ground spray equipment and is effective in irrigation systems at low concentrations. **FWY-ISP** is non-ionic, non-burning and non-toxic to all types of turf grasses.

- Increases soil moisture and softens seed cot for better germination.
- Uniformizes moisture and nutrient coverage.
- Increases water infiltration and penetration.
- Increases nutrient efficiency.
- Reduces run off and evaporation of applied water and nutrients.

DIRECTIONS FOR USE

Irrigation Injection; apply 2.5-5 L/ha through the irrigation system monthly or as needed.
Fertigation Injection; mix proportionately to liquid nutrients to apply 2.5-5 L/Ha per month or as needed.

Overseeding; apply 5 L/ha one week prior to overseeding. Immediately follow overseeding with a second application at 5 L/ha.

Enhanced fairway program: 5 L FWY-ISP + 3 L **Hydra 30^{Plus}** monthly in season.

Available in packages of 20 L, 208 L and 1000 L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

COMPOSITION:

Active Ingredient:
Non-ionic polyols:

14%

PRO-portioner system

A SIMPLE, NO MIXING METHOD OF APPLYING AQUA AID PRODUCTS

A convenient system with no chemical mixing for utilizing Aqua Aid Products that is as easy as hand watering. Four Pellet formulations that are designed to make hand watering more effective and longer lasting. Aqua Aid Pellets are non-toxic to all types of turf, annuals, perennials or ornamental plants.

OARS® pellets

The localized dry spot/dry patch pellet

- Manages the causes of water repellency and localizes dry spots / dry patches.
- 100% Active ingredients.
- Reduces hand watering.
- Increases water infiltration.
- Maximizes water availability.
- 35.5% Polyoxyalkylene polymers, 62% non-ionic polyols, 2.5% Potassium salt.

Aqua-Root® pellets

The humic acid nutrient chelation pellet

- 100% Active ingredients.
- Chelates and translocates nutrients.
- High cation exchange capacity.
- Formulated with humic acid.
- Helps rootmass development.
- 45% Humic acid, 55% non-ionic polyols.

Aquifer® pellets

The hydrating and rewetting pellet

- 100% Active ingredients.
- Manages localized dry spots.
- Reduces hand watering.
- Long lasting soil hydration.
- Increases water retention.
- Provides uniform wetting.
- 45% Propoxylated polyethylene glycols, 55% non-ionic polyols.

AQM® pellets

The root producing enhanced kelp pellet

- 100% Active ingredients.
- Reduces hand watering.
- Benefits of auxins & cytokinins.
- Encourages maximum root growth.
- Provides maximum root density.
- Maximizes water availability.
- 1% Kelp, 55% non-ionic polyols, 44% polyoxyalkylenes.





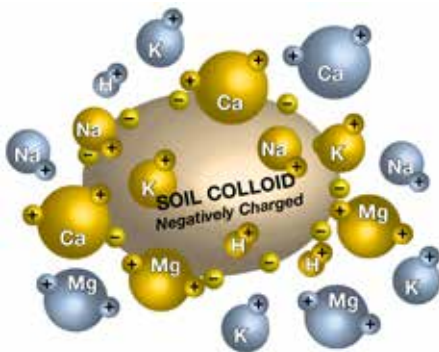
Specialty fertilisers

VERDE-CAL G, VERDE-CAL & VERDE-CAL F

Aqua Aid offers 3 calcium products: Verde-Cal G is a calcium sulfate better known as gypsum. Verde-Cal is a limestone product based on calcium carbonate. Verde-Cal F is an enhanced liquid source of calcium designed for foliar applications.

Background

The soil colloid has degrees of affinity for various basic cations. This bonding increases with larger atomic weight, ion size and amount of charge. The percentage of saturation for each of the cations will usually be within the following ranges for optimum performance.



Exchangeable cations are those absorbed on the colloid (yellow). Water soluble cations are those ionized in the soil solution (blue). Cation exchange capacity (CEC) is determined by the number of negative sites on the colloids.

Both granular Verde-Cal products are specifically designed to have an impact on the CEC, both are able to correct the CEC to the appropriate levels or to maintain or improve the CEC on the correct levels. **Verde-Cal G** and **Verde-Cal** are capable of making the calcium readily available for the plant. Independent research has shown significant increases in the calcium levels in the soil and inside the plant. Results show an increase of calcium in the plant just 9 days after application.

The secret of Verde-Cal products

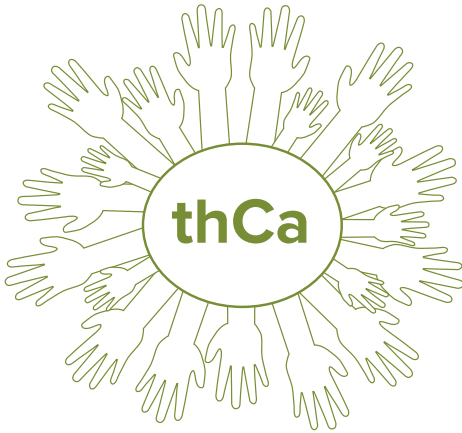
The reason why the calcium in both Verde-Cal products is so quickly available is because of a secret ingredient: **thCa**. This is a combination of plant extracts which are formed into trihydroxycarboxylic acid. This acid oxidizes the calcium molecules in the Verde-Cal products in order to make it

ELEMENT	IDEAL PERCENTAGE
Calcium (Ca)	60 - 70%
Magnesium (Mg)	10 - 18%
Potassium (K)	3 - 6%
Sodium (Na)	2 - 5%
Hydrogen (H)	10 - 15%

Cation exchange capacity

The process of cationic exchange begins when water and basic cations (Ca, Mg, K, Na) meet the soil colloid. Based on the soil colloid's degree of cation affinity, calcium will attach to the soil colloid releasing the smaller cations. The released cations (Mg⁺⁺, Na⁺, K⁺, H⁺) are solubilized in the soil solution and made available to the plant or removed from the soil profile. As hydrogen is released from the soil colloid into the soil solution, acidity is reduced and pH is raised.

available to the plant and soil. The **thCa** also oxidizes currently unavailable calcium in the soil, therefore adjusting the CEC evenmore. The calcium will be available over a longer period of time.



The value of thCa

- Allows you to apply 1/4 of the product compared to typical gypsum or limestone products.
- Makes calcium available now, not 2 to 3 years from now.
- Goes into the soil to make tied-up and unavailable calcium available again to the plant.

Comparison to conventional products

The formulation of both **Verde-Cal G** and **Verde-Cal** have very high concentrations of readily available calcium. Due to the combination with the **thCa** and a low dose of a polyol wetting agent the application rate for the Verde-Cal products is very low compared to conventional calcium products. Conventional calcium products have application rates ranging from 1,000-2,000 kg per ha. The normal maintenance rate for Verde-Cal products is only 250 kg per hectare. If there is a need to correct the CEC or pH the Verde-Cal products are used at a 500 kg per ha rate.



The composition of **Verde-Cal G** is 95% calcium sulfate, regular **Verde-Cal** is 95% calcium carbonate. Both formulations also contain a 1% Aqua Aid polyol wetting agent. This wetting agent attributes to the high solubility of the product. After application the product needs an irrigation cycle, the Verde-Cal products will dissolve directly and become available for plant and soil. Independent research has shown the superior solubility of the Verde-Cal products in comparison with a regular greens grade calcium product.

Verde-Cal G and **Verde-Cal** are available in two granular sizes, greens grade SGN 85 and coarse grade SGN 185.

Verde-Cal F is a enhanced liquid calcium product that can be applied as a foliar product on turfgrass and other crops.

Verde-Cal F contains plant essential calcium, magnesium and micronutrients. A foliar application will strengthen the plant and increases its resistance against diseases and pests.

Verde-Cal F can be a great add-on to foliar nutrition programs to reinforce cell walls and increase the plant defence system.



VERDE-CAL® G

GYSPUM ENHANCED WITH thCa

Calcium sulfate (gypsum) is combined with thCa™, an organic complexing agent. thCa makes the Calcium (Ca) in gypsum more readily available for soil or plant use without effecting or raising pH.

- 250 Kg will yield results equivalent to 1,000 kg of typical gypsum.
- Leaches excessive amounts of Sodium (Na) and Magnesium (Mg) from soil colloids.
- Supplies Calcium (Ca) without raising pH.
- Helps to loosen compacted, heavy clay soils.
- Supplies plant available Sulfur (S) in the sulfate form.
- Improves soil aeration and water percolation, curative against black layer.
- Quicker response at lower rates. Requires 33% the rate of standard gypsum per application.
- Ideal for turf, shrubs and flowers.

DIRECTIONS FOR USE

For continued optimal growing conditions, apply **Verde-Cal G** at 250 kg/ha monthly through the growing season, or as needed. Soil test recommendations should be followed.

To correct high sodium or magnesium levels or to loosen clay soils, apply **Verde-Cal G** at 5 kg per 100 m² or 500 kg/ha once or twice per growing season, or as needed. To correct high sodium levels on greens and tees or when using effluent water, apply **Verde-Cal G** at 500 kg/ha every month during the growing season.

Apply 4x 500 kg/ha with a 30 day interval to increase the oxygen and micropores in the soil. This will have a curative effect on black layer issues.

Available in granule size Greens (SGN 85) and Coarse (SGN185). Available in of 23 kg bags and 455 kg big bags.

Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

COMPOSITION:

Calcium Sulfate Dihydrate (CaSo4*2H2O):	95%
Calcium (Ca):	22.5%
Sulfur (S):	19%

VERDE-CAL®

ENHANCED CALCITIC LIMESTONE

Calcitic limestone combined with thCa, an organic complexing agent, converts insoluble calcium compounds to soluble and available calcium. This allows for greater delivery of calcium to the exchange sites on the soil colloid. **Verde-Cal** contains an Aqua Aid penetrant which synergizes with thCa, providing uniform nutrient movement into the entire soil profile.

- 250 kg will yield results equivalent to 1.000 kg of typical lime.
- Reduces hydrogen, sodium and chlorine in the plant and soil.
- Improves germination, stimulates root growth, and enhances micorbial activity.
- Increases essential nutrient absorption and translocation.
- Improves soil structure (flocculation, water infiltration).
- Supplies optimal calcium levels to plant cells to strengthen the its resistance to disease.
- Balances the Ca/N ratio in the plant.
- Quicker response at lower rates.
- Requires 33% the rate of standard lime per application.

DIRECTIONS FOR USE

To maintain optimum pH and growing conditions, apply **Verde-Cal** at 250 kg/ha at least twice per growing season or as needed. Soil test recommendations should be used to determine liming needs.

To adjust pH, apply **Verde-Cal** at 500 kg/ha. In most soils this will raise the soil pH up to one full point. Retest and if needed, reapply at the pH adjustment rate.

Available in granule size Greens (SGN 85) and Coarse (SGN185). Available in 23 kg bags and 455 kg big bags.

Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

COMPOSITION:

Calcium Carbonate (CaCO ₃):	95%
Calcium (Ca):	37%
Magnesium (Mg):	0.6%

VERDE-CAL® F

ENHANCED FOLIAR CALCIUM

Verde-Cal F is a liquid enhanced calcium product that can be applied as a foliar product on turf and many other crops. **Verde-Cal F** is ideally used as a product for plant protection and increased cell wall formation. **Verde-Cal F** contains plant essential nutrients like calcium, magnesium and trace elements such as Fe, Mn, Zn and Cu.

- Promotes the health and sustainability of the grass plant.
- Improves chlorophyll production.
- Increases drought resistance because of enhanced root mass development.
- VerdeCal F is a 100 % natural product.
- Contains important trace elements.
- Supports a large number of metabolic processes.
- Makes other foliar applied fertilizers become more efficient.
- Strengthens the cell walls.
- Tank mixable with most foliar fertilisers.

DIRECTIONS FOR USE

For turf application use 10-20 L/ha in 300 L water per ha per application. Apply at 14 day intervals. After each application, let the product dry for 3-4 hours to allow absorption through the leaves.

When used on soils with low organic matter and/or low natural mineral content in the soil, more frequent application and/or higher application rates per ha are recommended. For specific applications, consult your distributor for more information.

Available in packages of 10L.
Please check availability with your distributor

COUNTRY OF ORIGIN: United Kingdom

COMPOSITION:

Calcium Oxide (CaO):	52%
Magnesium Oxide (MgO):	6%
Trace elements (Fe, Mn, Zn, Cu):	0.1 - 0.2%
Neutralizing Value:	55

CONSOLIDATE TURF

INCREASING PLANT HEALTH WITH BALANCED NUTRITIONAL PROGRAM

Consolidate Turf is specialised in giving plants the building blocks to achieve their full genetic potential. Distributing the plants energy evenly throughout the plant, to enhance all natural beneficial characteristics. Increasing the tolerance of the natural defences and creating a healthier plant system. By managing the stress levels the products increase the plants genetic potential, this in turn enhances the plants performance, increasing disease resistance, root growth, sward density, colour and efficiency.

PRODUCTS

CONSOLIDATE PLUS

(15% Urea-N, 11% Ca, 2% Mg, 0.095% B, 0.75% Fe + Algae + Carbohydrates)

The nitrogen component of **Consolidate Plus** is a stabilised 'amine-N-complex'. This will prevent soft, excessive top growth whilst providing more energy for root growth. The boron and calcium in the fertiliser promote the formation of stable cell walls, protecting the grass against mechanical and drought stress.

The iron and magnesium within **Consolidate Plus** generate a good colour response whilst the seaweed and sugars promote energy and cell division, important for continued lateral growth. The micronutrients help the plant to function in an optimum manner throughout the spring and summer.

Consolidate Plus promotes natural plant hormones, auxins in the roots.

CONSOLIDATE K

(4% Urea-N, 11 % K₂O)

An easy plant-available source of potassium optimally which supports daily chemical metabolic processes. This constant supply of potassium to the plants greatly increases nitrogen efficiency, leading to optimal root and shoot development.

Overall, **Consolidate K** strengthens the resistance of the grasses, increasing the tolerance to drought, diseases, and potentially high salt levels.

CONSOLIDATE P

(9% Urea-N, 14% P₂O₅, 0.08% B, 0.25% Cu, 0.25% Fe, 0.25% Mn, 0.08% Mo, 0.5% Zn)

Based on phosphoric acid, **Consolidate P** has been formulated to prevent nutrient deficiencies by stimulating cell division and effectively transporting energy within the

plant. This helps to provide the necessary nutrition and is particularly beneficial in conditions where nutrients are not readily available. **Consolidate P** supplies young grasses with the necessary nutrients.

The unique action of this liquid nutrient compound improves cold tolerance and wear and tear factors, increases root development and establishes quicker sward development.

CONSOLIDATE MAGNESIUM

(13% MgO)

Consolidate Magnesium is a liquid nutrient feed designed to provide a colour boost. The formulation fixates magnesium in the chlorophyll of the plant, resulting in a green-up effect. This product also improves photosynthesis and provides a quick and effective result.

CONSOLIDATE TURF A.C.E.

(Trace elements + antioxidants)

Turf A.C.E is a special anti-stress formulation of ingredients, containing an elaborate trace element package and a mixture of antioxidants, including vitamins A, C and E.

Ethylene is an essential element for a plant's functioning metabolism and defense system, but excessive amounts can harm it. When under stress, the plant produces an excess of ethylene. **Turf A.C.E** enables the plant to virtually reset itself, reducing this overproduction and restoring normal metabolism.

CONSOLIDATE TURF CARB

(2% Urea-N, 10% Organic C, 37.5% Dry weight)

Turf Carb is a complex composition of carbohydrates, biostimulants, humic and fulvic acids that serve to increase the stress tolerance of grasses. The effects of stress on plants include a loss of vitality and increased susceptibility to diseases, as stress can open ports of entry for diseases and inhibit grass growth.

Turf Carb promotes healthy grass development through the functioning of plant metabolism. The carbohydrates in **Turf Carb** perform several functions. They not only provide an excellent food source for naturally occurring microorganisms, but also improve the dry matter in the leaf.

CONSOLIDATE SEED POWER

(0.62% Cu, 0.75% Mn, 1.20% Zn)

Consolidate Seed Power contains biostimulants to help de-stress plants and promote downward root growth. **Seed Power** can be used at any time when seeding or overseeding has taken place to help maximize seed germination and establishment.

Consolidate Turf Programs

RENOVATION PROGRAM

The extensive knowledge of plant physiology at Consolidate Turf resulted in a solution that enhances the uptake of nutrition at the early stages of grass seed germination.

By achieving and understanding this stage, Consolidate Turf was able to develop the process further and devise a unique program that catapults the seedling forward by several weeks, thus resulting in the vastly increased establishment of the playing surface.

The Renovation program consists of 6 key elements that each play a vital role in the initial early stages of germination and subsequent establishment of the sward. It is extremely important to achieve downward root growth to stabilise and anchor the plant whilst allowing the seedlings to grow, this is the specific role provided by the Seed Power and zinc.

RENOVATION PROGRAM:

Consolidate Plus	40 L/ha
Consolidate P	5 L/ha
Consolidate K	10 L/ha
Turf Carb	10 L/ha
Zinc	1 L/ha
Consolidate Seed Power	1 L/ha

Apply as soon as the grass has germinated, repeat after 5-7 days without the Seed Power.

All products can be tank mixed and applied at once. Apply in 400-500 L of water.



BALANCED FERTILISATION PROGRAM

The Consolidate Turf balanced fertilisation program is a complete liquid program. The programs consist of products that are balanced and developed in order to enhance each other. The programs listed below give an insight, every program should be tailored to the individual and local circumstances.

FOOTBALL (SAND BASED SURFACE):

Consolidate Plus	60 L/ha
Consolidate P	5 L/ha
Consolidate K	15 L/ha
Turf Carb	10 L/ha
Consolidate Magnesium	10 L/ha
Turf A.C.E.	1 L/ha

Application interval: 14 days
All products can be tank mixed and applied at once. Apply in 400-500 L of water.

GOLF (SAND BASED SURFACE):

Consolidate Plus	40 L/ha
Consolidate P	5 L/ha
Consolidate K	15 L/ha
Turf Carb	10 L/ha
Turf A.C.E.	0,5 L/ha

Application interval: 14 days
All products can be tank mixed and applied at once. Apply in 400-500 L of water.

Soil improvers

A WIDE RANGE OF SOIL IMPROVERS AND UV PROTECTION PRODUCTS

Aqua Aid offers a wide range of soil improvers and UV protection products. All these products are based on natural ingredients and are safe to use on all professional turf types. All products are designed and manufactured to solve various issues occurring in the professional turf market. This will include improved growing conditions and protection against biotic- and abiotic attacks. In addition to this, Aqua Aid has developed a product in order to defend the turf grass against damaging UV and infrared radiation.

Turf Power is an enhanced vermicompost produced by red wiggler worms. The product is a clear liquid extract which contains over 1,400 different DNA profiles of soil microbes.

Once these microbes are applied to the soil, the microbes will strengthen the soil surrounding the plant's root zone. The microbes also have a nutrient transportation function; the microbes will enter the meristem of the roots carrying nutrients for the plant. After leaving the nutrients behind, the microbes exit the plant root through the root hairs. This ongoing process has a positive

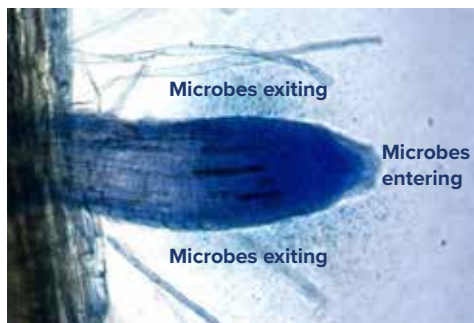
effect on the soil and plant health. The positive effects of **Turf Power** include increased root mass, thatch reduction, conversion of anaerobic soils, defensibility against phythium attacks and increased yields. All these claims on the beneficial effects of **Turf Power** have been independently researched and proven.

Aqua-Boost has been developed after many years of in-depth research and consultation with both professional grounds staff and greenkeepers. As a result, we have designed a unique composition of natural plant extracts, denaturated extracts and specially selected organic compounds which has resulted in **Aqua-Boost**.

The formulation contains high quality carbohydrates, L-amino acids, oligopeptides, polypeptides, mannitol, oligosaccharides, alginates, and polysaccharides, yeast extract, natural organice acids and betaines. This diverse blend of high quality ingredients works by activating specific physiological processes within plants.

This results in the plant being far better equipped to withstand any attack and it is able to use more energy on growing, developing a much denser sward, a significantly greater root mass and visibly higher chlorophyll levels.

VitaPower-X is developed and manufactured in order to control a large number of pests, pathogens, molds and viruses. The formula is developed not to kill the pests but to deter and discourage them from attacking the plant. The product is based on a citric acid extract, this is based on bioflavonoids, an ingredient which is also found in



Grass root



Root development with Turf Power

various vitamin C supplements. These bioflavonoids will generate an increase in the plant immune system making the plant more defensible against various attacks.

Field trials have shown parasitic nematodes moving away from the plant's rhizosphere.

Aqua-Grow is a non-phytotoxic plant based soil improver, the plant extract is a Quillaja Saponin extract resourced in Chile. The combination of the Quillaja Saponin and a low NPK analysis promotes the overall growth of the crop and supports the propagation of beneficial micro-organisms. This existing soil life will give the plant and soil a better defense system against biotic attacks. A more vital plant has a better defense system. Extensive field testing in various professional turf surfaces have shown the decrease of biotic attacks from severe attacks to hardly any attacks after just a few applications. The turf quality in all these situations went up significantly.



Quillaja Saponin plant

OCEAN is a highly concentrated foliar algae product. Enhanced with plant extracts and natural co-enzymes. **OCEAN** is based on the scientifically proven results of the *Ascophyllum Nodosum* seaweed extract. *Ascophyllum Nodosum* plays an important role in regulating the biosynthesis in the plant, especially the hormones cytokinin and auxin. This will improve the plant quality, growth and yield. The product contains plant specific proteins and fatty acids that contribute to a more vital crop, reducing the amount of chemical applications needed. Due to the high concentration of **OCEAN**, the applications are low and highly tank mixable with other products.

Liquid TS is a new generation of liquid organic fertilizer which will act as a soil conditioner. The formulation has a low nutrient analysis made completely from tea seed meal and is designed to refine the soil in times of stress. The application of the product is at the end of the summer and during the autumn. Due to the low nutrient analysis the product can also be used during the winter period when the temperatures still allow the application. The benefits of **Liquid TS** is the increase in resistance against seasonal stress and the improved consistency of the playing surface.

PLANT PROTECTION

Solar

Aqua Aid offers a new innovative UV and infrared protection product, **Solar**.

Solar is the latest UV protection product from Aqua Aid. This product is solely based on a high level of natural titaniumdioxide at 30% concentration. Providing complete protection from harmful radiation such as UV and infrared. **Solar** complies with all current and near future regulations and is completely MRL free.

The effect of **Solar** on professional turf grass is that all damaging uv and visible wavelengths will be filtered and absorbed out. The grass will be protected from harmful UV and solar radiation.

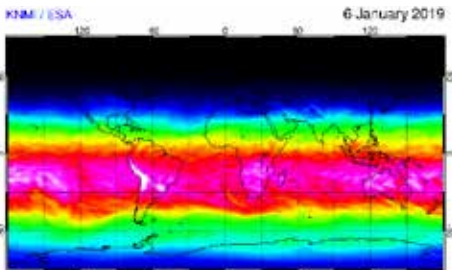
Another benefit of **Solar** is the fact the plant will transpire less, therefore reducing the amount of water used.

UV radiation is a damaging factor which is present everywhere in the world. These pictures show the UV radiation on two random dates during the summer. Aqua Aid advices to use these kinds of datasets in order to determine the application rate of UV protection products.

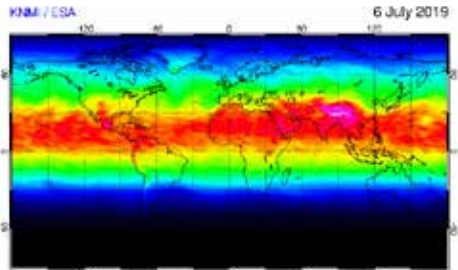
The product is suitable for all types of turf including golf greens, fairways and sports pitches. **Liquid TS** is a liquid product which will condition the playing surface quickly, and for a longer period of time.

Aqua-Sil is a fermented silicon product developed by Aqua Aid. Recent research evidence has proven that systematic applications of silicon-based products on turf grass have a beneficial contribution to grass growth and development. Especially during periods of stress or unfavorable growing conditions. Silicon is one of the most abundant mineral elements in the soil. Although there are high levels of silicon in the soil, the plant is unable to extract the silicon because it is highly insoluble. Silicon is most readily absorbed by plants as a orthosilic acid (H_4SiO_4). The silicon source of **Aqua-Sil** consists of orthosilic acid in a fermented form. The formulation contains 2% silicon, a high percentage for a very insoluble element.

The plant will absorb the silicon from the applied **Aqua-Sil**, the accumulation of silicon in epidermal cells and cell walls result in the development of more erect leaf blades and a thicker, stronger cuticle layer which limits transpiration and water loss. Due to this increase in leaf strength an increase in traffic tolerance has been observed in different trials. **Aqua-Sil** has a beneficial effect on the suppression of pathogen infections, the silicon creates a physical barrier that reduces the ability of fungal hyphae to penetrate into the leaf tissue.



Southern hemisphere January 6th 2019



Northern hemisphere July 6th 2019



Turf Power™

STRONGER, HEALTHIER TURF FROM THE SOIL UP

Turf Power was formerly known as **Worm Power Turf**.

Turf Power is an Organic Liquid Extract of 100% organic castings and worm-worked material that strengthens the chemical, physical and biological aspects of the soil around the plant's root zone. OMRI listed and CDFA certified, **Turf Power** improves soil health and the plant's health, vigor and strength. While turf practices and seasonal variables always vary, healthy soil is a universally vital element for healthy plants.

Through 10 years of trials and research with top leading university's, **Turf Power** has consistently been shown to produce stronger, healthier, more vigorous plants and produce better crops with higher yields.

- Provides viable macro- and micronutrients.
- Increases water holding capacity of the soil.
- Makes nutrient delivery more efficient over extended period.
- Introduces an active microbial community to the soil.
- Increases size, quality and yield.

DIRECTIONS FOR USE

Turf Application; apply as a soil spray at 25 L/Ha at 15 day intervals or 50 L/Ha at 30 day intervals. For best results, **Turf Power** requires growing season long application programmes.

In soilless media; apply 13,5 mL per L of growing container size every week throughout the growing season. In mineral soil media; apply 8 mL per L of growing container size every week throughout the growing season. If plants are in the ground, estimate the volume size of the root ball in liters and apply accordingly.

Available in packaging of 20 L, 208 L and 1000 L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: USA

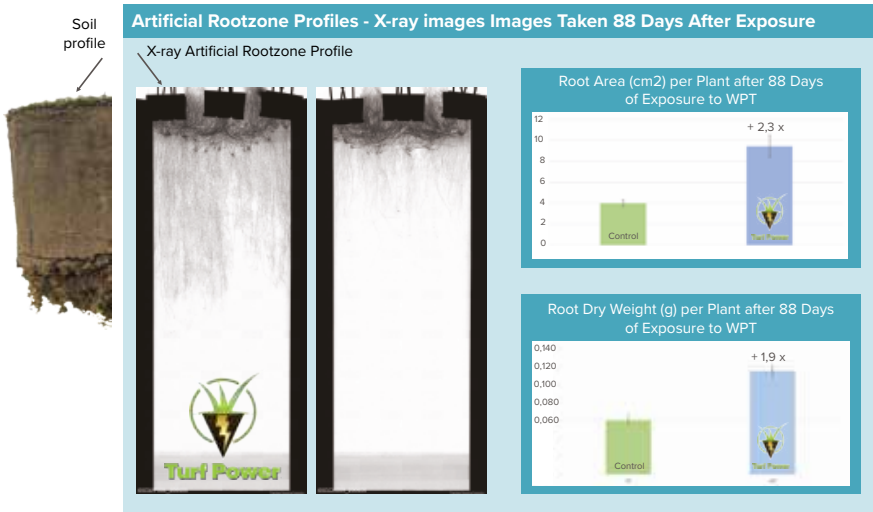
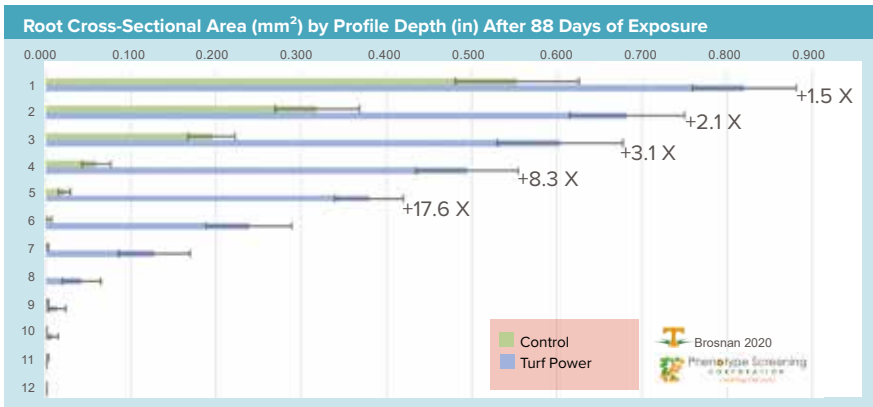
COMPOSITION:

Total Nitrogen (N):	0.002%
Available Phosphate (P2O5):	0.001%
Soluble Potash (K2O):	0.024%
Calcium (Ca):	0.003%
Magnesium (Mg):	0.001%
Sulfur (S):	0.003%

RESEARCH

In 2020, Dr. Jim Brosnan, Professor, University of Tennessee and Phenotype Screening Corporation (PSC) collaborated to evaluate the effects of Turf Power on annual bluegrass (*Poa annua*) rooting. The collaboration provided a new and innovative way to evaluate rooting through the use of Phenotype Screening Corporations' induced-expression phenotyping. This research utilizing X-Ray technology provided the turfgrass industry a precise look into Turf Power's effect on *Poa annua*.

Annual bluegrass (*Poa annua*) plants were grown from seed in an artificial rootzone profile. A complete nutrient solution was applied to all plants throughout the entire evaluation and served as a control. Turf Power was fertigated at an 8.5% solution to half of the samples. After 88 days of exposure both the control and Turf Power treated plants were evaluated utilizing PSC technology.



*Turf Power was formerly known as Worm Power Turf.

AQUA BOOST

PLANT DEFENCE ENHANCER

AQUA-BOOST is a liquid, non-phytotoxic blend of natural elements, created to strengthen the plants immune system. **AQUA-BOOST** supports the plants internal hormone production whilst under both biotic and abiotic stress. The natural plant extracts and denaturalized extracts in **AQUA-BOOST** support the overall strength and, in turn, enhances its own defence mechanism. Consequently, the plant is naturally stronger and better prepared to fight off attacks. It will also have more energy to grow, develop visibly higher chlorophyll levels and significantly improve microbial populations. The nutrient exchange in the root zone will increase, creating more root mass and a denser sward.

AQUA-BOOST works great with **Turf Power** as it promotes the growth of microbial populations in the growing media.

- Boosts the plants immune system.
- Increases the plants own hormone production.
- Feeds microorganisms and stimulates nutrients exchange.
- Works great with Turf Power.
- Increases turf density and quality.
- Improves decomposition of dynamic organic mass.
- Contains a low EC level and is therefore not harmful to the plant.

DIRECTIONS FOR USE

Apply 12,5-17,5 L/ha in 500 L water at a 4 week interval during the growing season. After renovation/reseeding, apply twice at a 2 week interval. **AQUA-BOOST** needs to be watered in with 3 mm irrigation within 8 hours after application.

Available in packaging of 10 L, 210 L and 1000 L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: The Netherlands

COMPOSITION:

Total Nitrogen (N):	0.4%
Available Phosphate (P2O5):	0.2%
Soluble Potash (K2O):	5%
Magnesium (Mg):	0.15%

AQUA-GROW

FOR A STRONGER ROOT SYSTEM AND PLANT VITALITY

AQUA-GROW is a liquid, non-phytotoxic product based on natural plant extracts that stimulates growth of new plant roots and strengthens the existing root system. **AQUA-GROW** consists of 100% natural plant-feeding substances and promotes the overall growth of the crop and supports the propagation of beneficial micro-organisms. **AQUA-GROW** ensures a more vital crop and improved soil life. A more vital plant has a better overall defense system.

- Stimulates root mass development.
- Improves soil microbial life.
- Improves plant defense systems.
- Delays formation of resistant strains.
- Beneficial throughout complete vegetative cycle.
- Environmental friendly.
- Improves qualitative and quantitative production characteristics.

DIRECTIONS FOR USE

The application rate is 20-60 L/ha, applied in at least 400 L water. **AQUA-GROW** needs to get well into the rootzone, hence a deep irrigation is required.

Moderate stress levels: use 20 L/ha on a monthly basis.

High stress levels: Use 60 L/ha monthly, distributed in 3 cycles evenly spread out within 1 month.

Available in packages of 10L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: The Netherlands

COMPOSITION:

Total Nitrogen (N):	1%
Available Phosphate (P2O5):	1.5%
Soluble Potash (K2O):	1.25%
Magnesium (Mg):	0.4%

VitaPower - X

A NATURAL SOLUTION TO BOTH ABIOTIC AND BIOTIC ATTACK

VitaPower-X is a liquid composition that boosts a plant's own defense system and alleviates the symptoms of stress and damage caused by an attack. The formula is centered around a citrus acid extract. This extract has shown to be highly effective in the control of a large number of pests, pathogens, moulds and viruses.

VitaPower-X is not designed to kill the pests but to deter and discourage them from attacking the plant. Field trials have shown parasitic nematodes moving away from the plant's rhizosphere.

- Improves plants natural defense system.
- Alleviates symptoms of stress and damage caused by an attack.
- Does not kill but deters and discourages pests.
- Environmental friendly.
- Stimulates plant growth, health and productivity.

DIRECTIONS FOR USE

Min 2 L/ha at weekly intervals. Can be used as plant and soil bio stimulant. Wash in soil applications with 2-5 mm irrigation direct after application (depending on soil type).

Flower bulb dipping in combination with 50% classic chemicals has shown effective results. For detailed application advise, please contact your distributor.

Available in packaging of 1 L and 10 L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: The Netherlands

COMPOSITION:

Total Nitrogen (N):	1%
Available Phosphate (P2O5):	1%
Soluble Potash (K2O):	1%
Dry Matter:	65%



NANO ALGAE FERTILIZER

OCEAN is a liquid product based on natural oceanic plant algae, enhanced with plant extracts and natural co-enzymes. **OCEAN** stimulates extra formation of roots and shoots allowing for more active and vital plants. **OCEAN** increases nutrient exchange and makes fertilizers work more effective. **OCEAN** contains plant specific proteins and fatty acids that contribute to a more vital crop, reducing the amount of chemical applications needed.

- Highly concentrated algae product.
- 100% Biological product.
- Contains Ascophyllum Nodosum algae.
- Increases plant defense system.

DIRECTIONS FOR USE

Sports Turf: apply 2 L/ha in 300-600 L /ha every 2-4 weeks.

When used as Co-Enzymes: 250-750 mL/ha weekly.

Soil: application through drip irrigation: 1 L **OCEAN** per ha every 2 weeks.

As Foliar/Spray: apply 2 L of **OCEAN** per ha in 300-600 L of water every 2-4 weeks.

Available in packages of 1 L and 10 L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: The Netherlands

COMPOSITION:

Total Nitrogen (N):	0.4%
Available Phosphate (P2O5):	0.2%
Soluble Potash (K2O):	4%

Liquid TS

ORGANIC LIQUID FERTILIZER DERIVED FROM TEA SEED MEAL

Liquid TS is a special liquid soil conditioner with a low nutrient analysis, made from plant extracts designed to refine the soil. **Liquid TS** is suitable for all turfgrass areas. It can be used all year round. For best results **Liquid TS** has to be applied before rainfall or watered in directly after application.

- Improves root mass and increases nutrient uptake.
- Increases plant tolerance to stress conditions.
- Encourages faster grow-in and establishment of new grass seedlings.
- Maintains plant count entering into a dormant period.
- Acts as a bio stimulant, which will enhance microbial activity.
- Can be applied to all types of turf.
- Suitable for all types of soil.

DIRECTIONS FOR USE

The application rate is 100 L/ha, evenly applied over the turf. It is very important to apply before rainfall or water it in with a minimum of 10 mm of water.

Optimum results have been achieved on aerated and saturated soils.

Available in packaging of 20 L, 200 L and 1000 L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: Belgium

COMPOSITION:

Total Nitrogen (N):	2%
Available Phosphate (P2O5):	0%
Soluble Potash (K2O):	4%
Contains Tea Seed Saponins:	>50%

AQUA-Sil

INCREASE DEFENSIBILITY OF PLANT AND SOIL

Silicon is an indispensable element in many biological processes. By using silicon as a fertilizer, the quality of both the plant and the soil improves. **AQUA-Sil** is a fermented product which naturally releases (ortho)silicon, amongst natural and plant beneficial elements. These elements are readily absorbable for the plant because of active micro-organisms, strengthening both the soil and the plants' health. A healthier plant has a higher resistance to physical stress, which increases the plants' productivity. Research has shown that when applying **AQUA-Sil**, the plant needs less water and is stronger. Analysis after application of **AQUA-Sil** also show an increase of chlorophyll in the plant.

- Increased quality of both soil and plant.
- Increased resilience to physical stress.
- Higher plant yield.
- Increased nutrient uptake.
- Reduced water use.
- Increased level of chlorophyll production.

DIRECTIONS FOR USE

Apply **AQUA-Sil** (bi-)weekly at 0.3-1 L/ha during the entire growing season. Can be mixed and applied in both foliar and soil based application.

Available in packages of 1L and 5L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: The Netherlands

COMPOSITION:

Silicon:	2%
Amino acids:	6%
Proteine content:	20%
Organic matter:	30%



SUN PROTECTION FOR PLANTS

SOLAR is a 100% natural product based on a blend of titaniumdioxide (TiO₂) and plant feeding extracts. **SOLAR** reduces the impact damage of extreme UV and infrared sunlight during summer heat conditions. **SOLAR** balances moisture behavior within the plant and increases stress tolerance. Titaniumdioxide is a natural product that scatters sunlight but allows enough light for the plant to grow. **SOLAR** is MRL free and protects the plant against cell wall deformation. **SOLAR** reduces plant stress during summer conditions and reduces water consumption as the protective layer limits the evapotranspiration. Leaving no residue, **SOLAR** is 100% safe for the environment.

- Filters harmful UV and infrared light.
- Reduces organic pollution on the leaf.
- Leaves enough useful light for the plant.
- Forms a protection shield that offers resistance and promotes growth.
- Contains mechanical resistance to pollution.

DIRECTIONS FOR USE

Turf: depending on solar stress 0.5-2 L/ha weekly or biweekly.

For greens 0.5-1 L/ha weekly, for fairways 1-2 L/ha biweekly.

Bulb / Tuber plants: depending on total leaf surface 0.5-2 L/ha weekly or biweekly. We advise to add a spreader to the tank mix in case of larger plant leaves.

Available in packaging of 10L.
Please check availability with your distributor.

COUNTRY OF ORIGIN: The Netherlands

COMPOSITION:

Total Nitrogen (N):	11%
Available Phosphate (P2O5):	0.9%
Soluble Potash (K2O):	2.0%
Magnesium (Mg):	0.3%
Content Titanium Dioxide:	30%



Tools

MOISTURE METERS, WEATHER STATIONS AND MORE

Aqua Aid is official dealer of Spectrum Technologies. Products mentioned in this brochure are always on stock, all other Spectrum products are available on order.

TDR

Responsible irrigation management and reducing costs is possible by using the FieldScout Soil Moisture Meters. The TDR-technology has proven itself for over 30 years as a very accurate meter for soil moisture measurements in a lot of soil types.

There are 3 meters available: **TDR-150**, **TDR-250** and the **TDR-350**. After years of loyal service the FieldScout TDR-100 Soil Moisture Meter has been succeeded by the FieldScout **TDR-150** Soil Moisture Meter. Without compromising the reliability, the new moisture meter has been improved in terms of performance and accuracy. Next to that, the meter gained several new functionalities. The **TDR-150** meter measures the exact volumetric water content (VWC) in a percentage. Next to the VWC the **TDR-150** meter also measures the electroconductivity (EC) of the soil in mS/cm.

It is possible to equip the meter with a GPS and Bluetooth application. This way you can link the soil measurements to GPS coordinates. With the Bluetooth function it is very easy to link the meter to every

smartphone. In combination with the FieldScout Mobile App the measurements will be made visible in a colourful way.

The **TDR-250** is a simplified and portable ergonomic designed moisture meter.

The **TDR-350** is standard equipped with GPS and Bluetooth. This way you can link the soil measurements to GPS coordinates.

Every TDR can measure the VWC on several depths. In order to do this several measuring rods are available. The end-user can choose the depth according to the measuring needs. The following lengths are available: 3.8 cm, 7.5 cm, 12 cm and 20 cm.

Watchdog 3250 weatherstation

Almost all greenkeeping work is weather dependent. But especially in times of changing climates, old weather rules or typical weather patterns at certain times of the year are no longer valid. The reality is that extreme weather conditions are becoming more and more common, putting a lot of stress on the grasses. By tracking different parameters like humidity, temperature, wind speed, precipitation and evapotranspiration (ET) one can take the necessary precautions. All these measurements are ideally performed with the **Watchdog 3250**.



TDR-350



Watchdog 3250

TruFirm

The primary objective for the development of the **TruFirm** is to improve championship caliber playability by cultivating greens that are both firm and fast. By measuring the relationship between the compaction of the soil and the moisture level, greenkeepers are able to ensure healthy, aesthetically-pleasing greens that offer exceptional playability.



TruFirm

TCM 500

The **Turf Color Meter (TCM) 500** NDVI Meter from Spectrum helps diagnose plant health based on colour. The meter will calculate the Normalized Difference Vegetation Index (NDVI) based on the colour of the grass.



TCM 500 NDVI meter

Pitch Growth Cover

Pitch Growth Cover provides year-round protection and optimal conditions for turf. In winters, the temperature drop in the turf remains limited due to the insulating effect of the cover. In summers, it provides protection from too much light and rain.



TDR 150/250/350

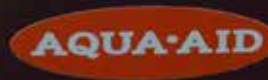
FIELDSCOUT SOIL MOISTURE METERS

The Fieldscout **TDR 150/250/350** are soil moisture meters that take soil moisture readings at the press of a button. With variable rod length options, you can measure soil moisture at your ideal root zone. The Fieldscout **TDR 150 and 350** are the expanded and completely updated versions of the TDR 100 and 300, combining a compact display with an advanced soil moisture probe that is connected to each other via a cable (1.5 m) or a telescoping handle. New is the optional (**TDR 150**) and integrated (**TDR 350**) GPS & Bluetooth functionality to instantly collect and display data to your smartphone. With new enhancements, the **TDR 150/250/350** provide significant improvements in performance and measurement accuracy for optimal soil conditions. The meters can be used in various applications, such as on sports fields, golf courses, horticulture, grow containers, open ground areas, road construction and in public green areas.

Features	TDR 150	TDR 250	TDR 350
Measure VWC %	✓	✓	✓
Displays EC + Surface Temp.	✓	✗	✓
Interchangeable soil probes	✓	✓	✓
Backlit Display	✓	✓	✓
T-handle	✗	✓	Telescoping
Infrared Temperature Sensor	Optional	✗	Optional
GPS / GNSS + Bluetooth	Optional	✗	✓
Carrying Case	✓	✗	✓
Fieldscout Mobile / SpecConnect	✓	✗	✓

All devices are equipped with a industry exclusive backlit display. Data is collected with USB flash drive. No PC interface needed.

The measuring probes of 3.8cm, 7.5cm, 12cm or 20cm are not supplied as standard, and need to be ordered separately.





USE THE FIELDSCOUT MOBILE APP TO INSTANTLY COLLECT AND DISPLAY DATA FROM THE FIELDSCOUT® TDR 150 AND 350 SOIL MOISTURE METER USING BLUETOOTH SMART CONNECTION.



Watchdog 3250

WIRELESS ET WEATHER STATION

The award-winning third generation of **WatchDog** Weather Stations offers integrated cellular modems that send essential turf data to the SpecConnect cloud. Use your PC or WatchDog Mobile app to view current conditions on your smartphone. Station set-up is easy and configuration is simple with the WatchDog app.

The newly developed **Watchdog 3250** Wireless ET Weather Station is a mobile, fully integrated weather station. The station is solar powered and has a built-in modem. This means there are no power or network cables to attach, increasing the flexibility of the system.

With the SpecConnect cloud, you can easily view reports for degree-days, chill hours,



disease and insect pressure, monthly weather reports, soil moisture trends and more.

Temperature alerts are sent to your smartphone so you can respond quickly and reduce turf damage. Now you will have the real-time data you need to respond to changing weather conditions and make timely, smart decisions.

The **Watchdog 3250** is the most elaborate version of the 3000 series weather stations. Next to all the actual measurements, it also performs a range of calculations, including the important ET (evapotranspiration) rate.

Features	3250	Range	Accuracy
Air Temperature	✓	-40 to 125°C	+/- 0.3°C
Relative Humidity	✓	0 to 100%	+/- 2.0% @ 25°C
Rainfall	✓	0.254 mm resolution	+/- 2.0% @ 5 cm/hr
Solar Radiation	✓	0 to 1500 W/m ²	+/- 5.0%
Wind Direction	✓	1 to 359°, 1° increments	+/- 3.0°
Wind Speed	✓	0.1 to 322 km/h	+/- 3.0 km/h
External ports	1		

TruFirm

FIRMNESS METER

The primary objective for the development of the **TruFirm** is to improve championship-caliber playability by cultivating greens that are both firm and fast. By measuring the relationship between the compaction of the soil and the moisture level, greenkeepers are able to ensure healthy, aesthetically-pleasing greens that offer exceptional playability. Data acquired from the device allows golf course superintendents and sports turf managers the ability to take appropriate actions to reach the desired firmness of golf course greens, fairways, and bunkers, as well as other playing surfaces. The patented **TruFirm** system utilizes a hemisphere-shaped impact hammer that mimics the shape of a golf ball to better simulate golf ball impacts. The mass is dropped from a consistent height and the maximum turf penetration value is recorded and correlated to the surface firmness — the lower the penetration value, the firmer the turf.

- Evaluate trends and monitor sections of turf relative to one another.
- Easy-to-use design provides instantaneous measurements.
- Logged data can be sent via Bluetooth to a mobile/handheld device for plotting specific greens or other surfaces.
- Lightweight design results in an easily portable device without the need for extra parts.
- Includes soft-sided carrying case.



TCM 500 NDVI

TURF COLOUR METER

Turfgrass quality is visually evaluated by human assessors based on a scale of 1 (dead grass) to 9 (perfect grass) in the current assessment method. This evaluation practice has several disadvantages and therefore, there is the need for a better evaluation technique. Individual biases are inevitable and lead to some level of inconsistency, even among the most highly trained observers. Research from Clemson University, South Carolina, USA: “Predicting Visual Quality Ratings of Turfgrass Research Plots Using Spectral Reflectance” (Muharrem Keskin, 2003) is the basis for the technology used in the **TCM 500 NDVI**.

- Measures reflected light from approx. a 3 inch (7.6 cm) diameter section of turfgrass.
- Uses an internal light source to negate the effect of sunny versus cloudy conditions.
- Measures reflectance in the red (660 nm) and near infrared (850 nm) spectral bands.
- Displays result as NDVI, percent reflectance, or as a useradjustable grass index from 1 to 9.
- Equipped with internal data logger and RS-232 port.
- Records 3,250 measurements (1,350 with added GPS/DGPS option).
- Configures the meter with FieldScout® software and USB.
- Compatible with SpecConnect.
- Includes hard carrying case, batteries, and TCM 500 T-Handle.



Turf Color Index:

A close-up of the device's LCD screen showing the turf color index. The text on the screen reads: 'Grass Index=7.20' and 'N=10 Avg=7.44'.

Grass Index=7.20
N=10 Avg=7.44

NDVI:

A close-up of the device's LCD screen showing the NDVI value. The text on the screen reads: 'NDVI = .784' and 'N=10 Avg = .780'.

NDVI = .784
N=10 Avg = .780

Pitch Growth Cover

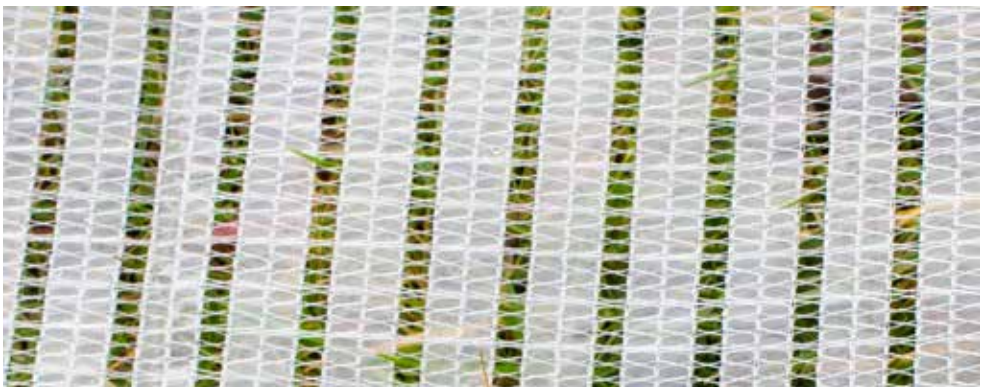
YEAR-ROUND PROTECTION

A **Pitch Growth Cover** provides year-round protection and optimal conditions for turf. In winter, the temperature drop in the base layer of the turf remains limited due to the insulating effect of the **Pitch Growth Cover**. Less heat is lost when underground heating is used, which results in lower energy costs. A **Pitch Growth Cover** provides protection from too much light and rain in summer. The cover reflects UV and infrared light, incoming light is diffused under the cover causing less damage to seedlings and ensuring better germination.

- Breathable, light and water permeable.
- Reduces temperature drops in the turf base layer, prolonging the growth phase.
- Less heat loss when using an underground heating system, saving energy costs.
- Faster warming of the soil in spring, promoting premature growth.
- Faster germination/growth of reseeded/new seeding.
- Protection of young seedlings from water stress/drying out which saves on irrigation passes and reduces nutrient leaching.

TEST RESULTS

		Method
• Light transmission in direct light	90%	NEN2675
• Light transmission in diffused light	80%	NEN2675
• Weight	62 g/m ²	
• Water permeability	0.204 m/s	ISO11058

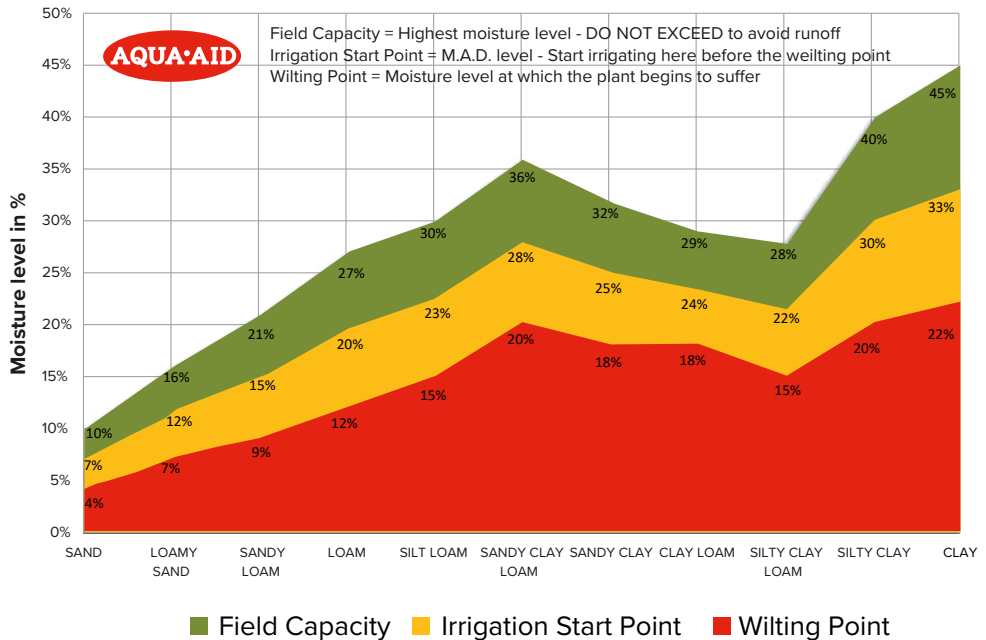


Soil moisture range

OPTIMAL SOIL MOISTURE RANGE FOR IRRIGATION SCHEDULING

In-field soil moisture content will range from air-dry to saturation. However, plants cannot extract all the water in a saturated soil and can extract none of the water in an air-dry soil. Instead, two other moisture content levels, **field capacity** and **permanent wilting point** are often used to indicate the upper and lower limit of **plant available water**. Field capacity is defined as the condition that exists after a saturated soil is allowed to drain to the point where the pull of gravity is no longer sufficient to remove any additional water. Water draining from a soil profile cannot, in general, be taken up by plant roots. On the opposite end of the spectrum, permanent wilting point is in the highest moisture level at which an indicator plant cannot recover turgor after being placed in a humid environment.

Irrigation should be scheduled somewhere between these two extremes. One rule of thumb is to apply water when half of the plant available water has been depleted. However, individual circumstances may dictate a more conservative or liberal approach. The chart below illustrates the plant available water range for the 12 USDA-defined soil textures. Keep in mind that these numbers are merely guidelines and will vary for individual soils.



Aqua Aid Europe BV is a leading company in the field of sustainable water management, offering innovative solutions to support the irrigation and turf industries. Founded in the Netherlands, Aqua Aid Europe has established a strong presence across Europe and beyond, providing high-quality products and services that promote water conservation, soil health, and environmental sustainability. With a team of experienced professionals and a deep commitment to research and development, Aqua Aid Europe is at the forefront of the industry, delivering cutting-edge technologies that optimize water use and enhance plant growth. Whether you are a sports turf manager, farmer or landscaper, Aqua Aid Europe has the expertise and tools to help you achieve your goals and thrive in a changing world.



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