



CITY OF IRVINE
ATHLETIC FIELDS MAINTENANCE
PRACTICES

ATHLETIC FIELDS MAINTENANCE PRACTICES

The purpose of this manual is to explain in detail all the necessary functions and tasks involved in athletic fields maintenance practices. It will explain the following sport field management practices:

1. Annual Schedule Turf Management
2. Sport Turf Management
 - a) Aerification
 - b) Slicing/Spiking aerator
 - c) Verti-cutting/Dethatching
 - d) Verti-drain/Deep Tine
 - e) Topdressing (Sand & Organic)
 - f) Over seeding
 - g) Compost
 - h) Sod/Turf Replacement
 - i) Mowing
 - j) Organics
3. Soil Analysis
4. Irrigation Water Analysis (Water Management)
5. Fertilization
6. Specification Infield Maintenance
7. Pesticides – Integrated Pest Management Policy

City of Irvine

Annual Schedule

Annual Schedule Turf Management	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Aerification	Blue					Blue		Blue			Blue	
Slicing/Spiking Aerator			Brown									
Verticutting/Dethatching				Yellow								
Verti-drain/Deep tine					Orange							
Sand top dressing					Pink							
Over seeding/Inter seeding		Black										
Compost top dressing							Red					
Sod Installation							Green					
Mowing	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Soil Analysis			Dark Blue			Dark Blue			Dark Blue			Dark Blue
Irrigation Water Analysis			Dark Blue						Dark Blue			
Annual Field Maint. Closure 7/3 to 9/8							Grey	Grey	Grey			

Annual Schedule Fertility- Liquid	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Suma Gro	Dark Red								Dark Red		Dark Red	
Arable One						Yellow	Yellow					
Great Eight (1-0-0)				Orange	Orange							
Emerald Green (8-4-8)		Dark Blue						Dark Blue				
EZ Wet Soil Penetrant			Blue							Blue		Blue

Annual Schedule Fertility- Granular	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
JTM w/ Sea Kelp (8-2-7)								Yellow	Yellow	Yellow		
JTM Activator Calcium (8-2-7)			Orange	Orange								
Live Earth (8-2-4)	Green	Green									Green	Green
Humate Soil Conditioner					Blue							
Tri-C Humate						Red						
Tri-C Myco							Dark Blue					

City of Irvine

**Sports Turf
Management**

Sports Turf Management

The annual turf program consists of fertilization, aerification, Slicing /Spiking, verticutting, topdressing, overseeding, and turf/sod replacement.

Aerification: Aeration plays one of the most important roles in managing all turf areas. Sport turf is to be aerated by removing 1/2" to 5/8" diameter hollow tine cores to a depth of 2-1/2" to 3" with spacing between cores, not to exceed 3", using a piston type aeration machine. All cores must be removed on the same day aeration takes place with use of core harvester or core pulverize or other approved method. Contractor is responsible for locating and marking irrigation and other components prior to aeration.

Slicing/Spiking aerator: Slicing slices the rhizomes and stolons so that they can begin to deteriorate and do not become a thatch problem. Also this slicing of the rhizomes and stolons has had the effect of causing new plants to spring up much more frequently than they would without the slicing. This means more plants per square inch and a more wear resistant turf.

Verti-cutting/Dethatching: The process of mechanically removing thatch using fixed blades spaces less than one inch apart to a depth of one quarter inch into the soil. The debris shall be removed from the surface through a turf vacuum or rotary vacuum mower.

Verti-Drain/Deep Tine: Deep tine aeration (Verdi-Drain) entails driving a spike, as long as 3/4" X 10" on larger machines, into the soil at 90 degrees and exiting at a 45 degree angle so that it literally shatters the soil below on 6" centers. Next we pull plugs with a 3/4" X 10 plug puller across the field on 6" centers. This creates a void area that roots can move into. Again on tight clay soils (Irvine type soil), it is important that we sweep up the cores, top dress and drag sand & organic material into the holes. Contractor is responsible for locating and marking irrigation and other components prior to Verti-Draining/Deep Tinning.

Topdressing (Sand topdressing & Organic topdressing): Top dressing is the only way to change a poor soil profile without totally ripping up the soil, amending it properly, and re-sodding. Top dressing is also an effective way of filling in low spots or re-leveling the wear areas as they occur each year. Low spots left unrepaired become dangerous trip areas that tend to get more wear and collect standing water. Sand topdressing is an 80% sand and 20% organic compost. The 1/8" size shall be applied to a depth of up to 1/4" using a tip dressing machine, evenly spreading the sand over the designated area. After the sand has been applied the entire area shall be dragged with an appropriate drag mat, going over the area in a circular pattern until the sand is evenly distributed and with a smooth surface and watered in thoroughly by the end of the workday. Soil organic help prevent compaction, add microbes, help control turf diseases and provide dark green color on turf.

Over seeding: Warm weather grasses such as Bermuda begin to go dormant in late fall and winter. Over-seeding with perennial rye grass at this time gives these fields a growing surface to play on and helps prevent the complete destruction of the dormant Bermuda plants. Seed shall be spread by a broadcast type and covered with a top dressing material. A second method of over seeding is to utilize the Inter-seeding/spike and seed method. Seed shall be inserted into the soil using an inter-seeding or spike and seed machine. Applying the seed in two different directions over the designated area and after completion of the inter-seeding, the debris shall be removed. An application of 1/4" organics may be scheduled immediately after this process. Over seeding with perennial rye seed only occurs to sport fields that are considered premier and lighted.

Compost: Composting is the process of combining several sources of organics as well as grass clippings, food by-products, recycled newspapers, removed thatch, mulched tree limbs and even chewed up old wood shingles. If turned properly in the sun and composed of the right mixture and moisture, compost temperatures will reach 135-145 degrees in the center of the pile. This will kill weed seed and pathogen bacteria, but must be turned evenly and often to insure that there are not some cool spots where the process was not completed. By the time these are diluted, you end up with an organic content of 15-25%.

Sod/Turf Replacement: Sodding shall be accomplished by removing existing turf and soil with the use of a sod cutter. New sod shall be installed and the height of the grade shall be level with existing turf and grade. All new sod areas will be rolled with an appropriate size and weight roller until the area is free of bumps and low spots.

Mowing: Athletic fields shall be mowed a minimum of once per week for a total of fifty-two times per year. Additional mowing of athletic fields may be required for tournaments and on over seeded fields. Bermuda turf shall be mowed using a hydraulic driven reel mower capable of mowing a minimum height of half-inch. Bermuda turf that has been over-seeded with Perennial Ryegrass can be mowed with either a reel or rotary mower. All turf and hardscape areas shall be free of turf clippings, plant debris and trash at the end of the scheduled mow day.

Organics: Organic soil contains carbon based material that is living or once living. It contains organic matter that is rich in many nutrients and minerals. Organic soils consist of decaying plant material, microorganisms, worms and many other things. Mulch, compost, and manure can be used to amend nutrient deficient soil like sandy soil, and turn it into rich, organic soil packed with nutrients. Organic materials also facilitate drainage while retaining moisture. Soil amendments are vital when preparing soil for planting. Soils must be amended often or else the soil will become void of nutrients and organic matter.

Aeration

Aeration plays one of the most important roles in managing all turf areas. It is an especially effective tool when used on athletic fields. The frequency that you aerate should be based on the wear factor of your field. The heavier your play the more quickly the soil compacts and therefore the more frequently you will need to temporarily relieve the compaction. The type of aerator you use is very important because it is very difficult to even find a period of time between play to get on the field. When you pull and leave cores on the field, the coaches and players complain that these plugs can actually deflect the ball, with sports that have the ball rolling on the ground.

Therefore it may be necessary to use a knife-type aerator that makes a clean slit in turf without leaving any residue at the surface. This field can be played on immediately upon completion of the aeration.

Aeration falls into two main types- annual renovation and regular maintenance.

Annual Renovation

In cool weather grass areas this type of aeration is done in early spring just prior to the turf regeneration and seed germination. The key point is that this aeration is going to disturb the soil and the surface area because of the amount of aeration and the top dressing that usually accompanies this and we want the grass to grow up through this layer quickly.

In warm weather grass areas the turf goes dormant in the fall and begins to grow again in early spring. If you over seed these areas with rye grass, just prior to dormancy, you can over-seed and do this type of aeration and top dressing. If you don't over-seed in the fall, just before Bermuda comes out of dormancy is probably the best time for this type of aeration.

Types of Renovation Aerators

Renovation aeration is a necessity if we are ever to break through the tightly compacted soil in the top 3" of the root zone. All of machines listed below will all do this, but in heavily compacted clay 4of the 5 machines listed below may not go very deep on the first or even the second pass. The one exception is the recycle dresser by KORO which saws its way through the tightest of compacted soils. All of these machines are dramatically affected by any rock in the root zone. The rock will damage all of these machines if they are 2" or larger and in any quantity at all.

fields that were built in layers (90%) and have developed a stratification effect with a hardpan causing standing water. Deep-tine aeration costs approximately \$.028 /per square foot for 2 directions as described above, and a 72" "Soil Reliever" machine will cover 3/4 acre per hour. The major concern is that we miss irrigation heads and stay above the irrigation system by flagging the heads and also the lines if they are less than 12" deep. Deep-tine aeration has a dramatic effect on highly compacted soils and compacted athletic fields.

This machine is also affected by very tight clay and may require two passes with the solid tines and the third pass with the plug pulling tines to get deeper into the soil.

4. Recycle Dresser

This machine makes saw cuts 8" deep by 1/2' wide on 12" centers and drags teeth between the saw cuts on 6" centers and 12" deep. This literally breaks the compaction, pulls soil out of the root zone, makes top dressing out of it and spreads it 1/3" thick over the surface. This is probably the very best renovation because it is almost like roto tilling but the turf recovers very quickly. It runs about \$600 per acre and on sandy soils can do several acres per day in sandy soil and one acre per day on tight clay soils. This machine will work in the hardest of soils as long as there is not rock in the root zone. This will damage the saw blades.

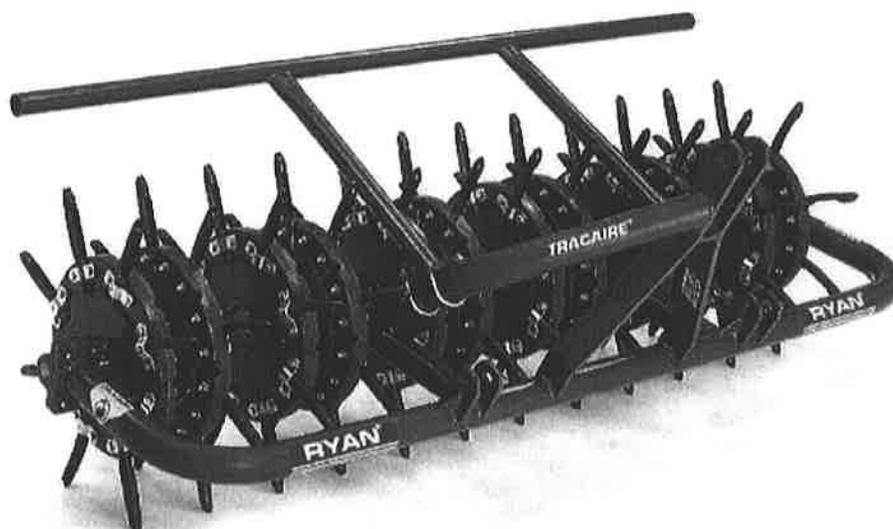
Maintenance Aeration

Maintenance aeration is the regular aeration you do after the major renovation aeration has been done and you are temporarily relieving the compaction that has taken place since the last aeration. This can be as frequently as weekly in the wear areas in very tight clay soils under very high wear conditions. Most often the minimum should be monthly aeration in high wear conditions. Both the Tracaire and Aerway aerators can use plug pulling and knife aerator blades- it is a matter of unbolting one and replacing it with the other.

Plug pulling

Plug pulling is always the best aeration because it exposes the root zone to oxygen, thatch eating microbes and bacteria. However in tight clay the holes swell shut within weeks so you start over again every time. The major problem with plug pulling in tight clay soils

Tracaire® Aerator



The Ryan® Tracaire helps you alleviate compaction problems that result from constant heavy use and seasonal changes on fairways, athletic fields, parks and many other large areas. Aeration develops deep rooted grass so that the turf is not uprooted during severe use in wet conditions. Mount the Tracaire on any tractor with

a category "1" 3-point hitch. It covers a 6-foot aerating width with its coring, slicing or deep spoon tines. A drag mat can be used for breaking up cores while you aerate.

TRACAIRE® AERATOR

Model 544423

■ UNIT

Power: Tractor mounted

Hitch: Standard 3-point tractor hitch, category "1"

Axle: Aerating wheels—1.25" (3 cm) diameter

Aerating Wheels: 12, cast iron with sintered bushings, pressure lubrication fitting, grooved for mounting aerating tines on both sides; each wheel weighs 75 lb (34 kg)

Tines: 8 per wheel (96 total); standard one set 3/4" (1.9 cm) coring; optional 1/2" (1.3 cm) coring, 6" (15 cm) or 7 1/2" (19 cm) slicing, open-spoon; wheels can be mounted with double set of tines, 16 per wheel (192 total)

Aerating Width: 72" (1.8 m)

Coring Depth: Up to 4" (10 cm)

Aeration Pattern: 6' x 8" (15 cm x 15 cm) with single tines, 3" x 3" (8 cm x 8 cm) with double tines

Holes Per Sq Ft: Up to 9 with single tines, up to 18 with double tines

Productivity: 3 acres per hour (1.2 ha/hr) at 4 mph (6 km/h)

■ DIMENSIONS

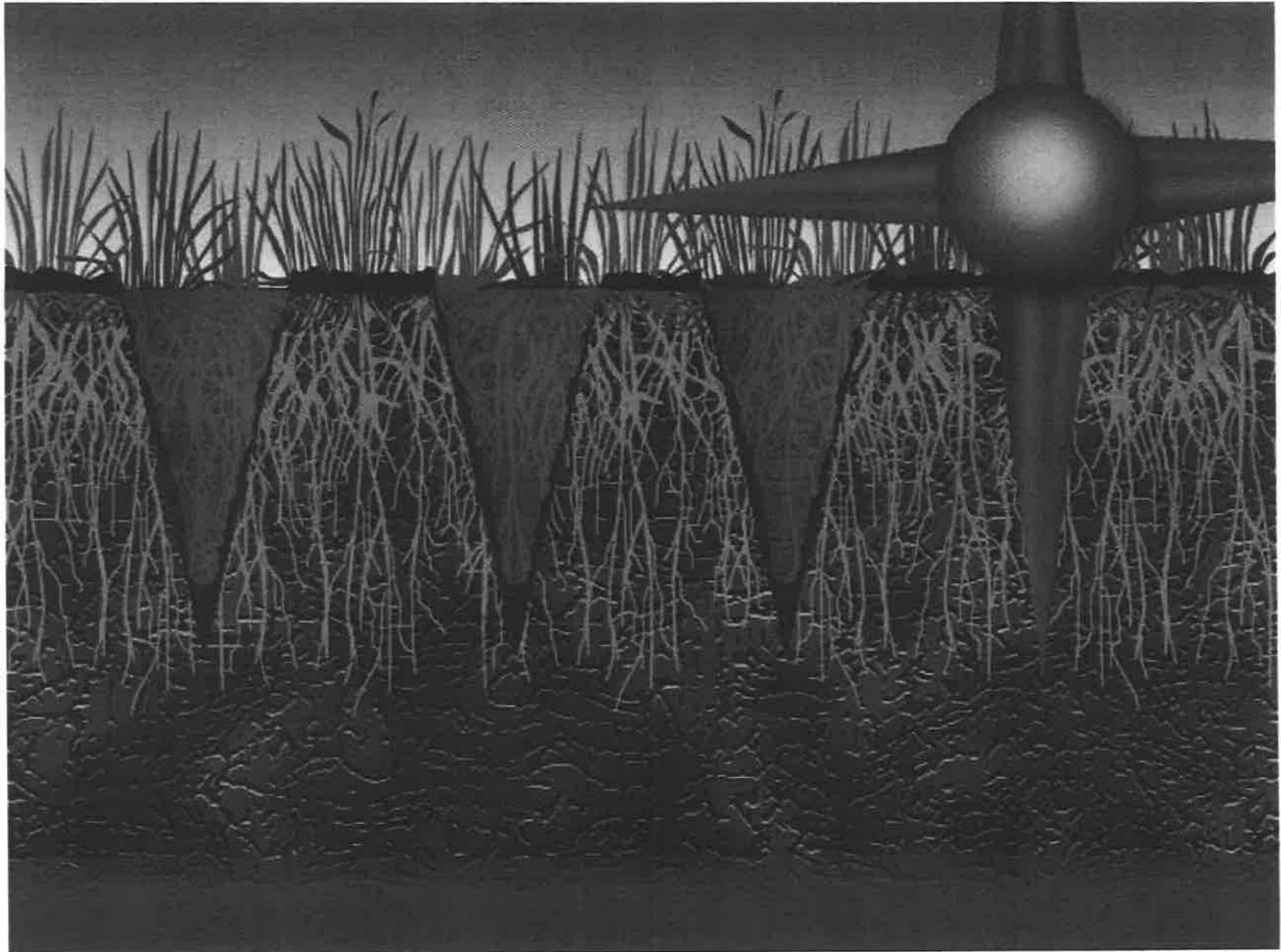
Size: 78" W x 48" L x 24" H (2 m x 1.2 m x 0.6 m)

Weight: 1011 lb (459 kg)



Aerate with the Tracaire to improve the condition of heavily used turf areas such as athletic fields and parks.

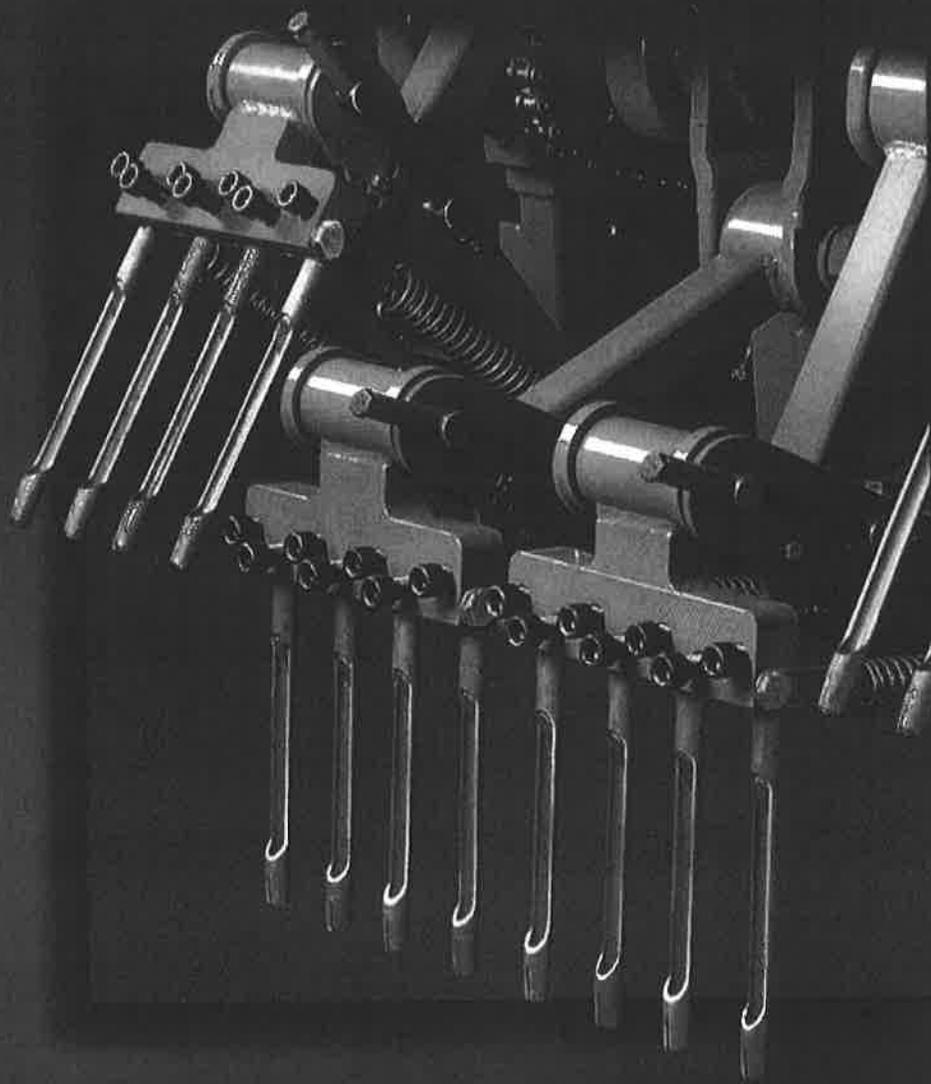
Specifications subject to change without notice.



Knife Aeration

The **Soil Reliever**[®]

From **Southern Green**



Breathin' a Whole Lot Easier!

AerWay simplifies deep-tine aeration

At first glance, AerWay 200 Series shattertines may look like slicer blades, but that's where the similarity ends. AerWay 200 Series shattertines simplify deep tine aeration with a unique twisting action deep in the soil for fast and effective compaction relief. No cores, no PTO, no complex machinery. Aerate and play right away with AerWay 200 Series turf aerators.

Effective aeration made simple

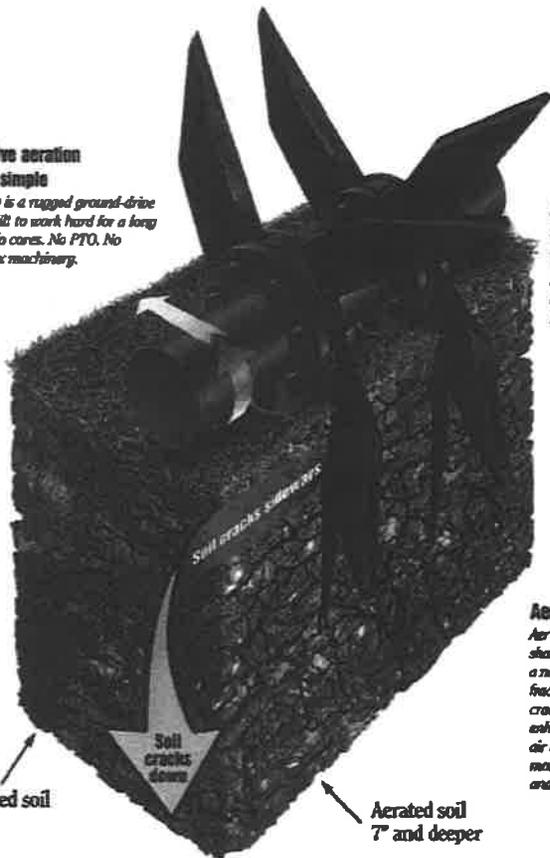
AerWay is a rugged ground-drive unit built to work hard for a long time. No cores. No PTO. No complex machinery.

Aerate and play right away
Surface disruption is minimal

Patented shattertines are the key

Like a crooked tire seems to wobble down the road, AerWay's uniquely angled tines twist through the soil to eliminate compaction both sideways and downward.

Compacted soil



Aerated soil 7" and deeper

Aerates deep
AerWay 200 Series shattertines create a network of fractures and cracks that enhance soil air and water movement 7" and deeper.

AerWay 100 Series tines penetrate 6" deep to break through deep layering, enhance rooting, and aid infiltration



For many applications, AerWay 100 Series finetines are the aeration solution you've been looking for. Aeration is effective, fast, and easy with virtually no surface disruption. You'll see the difference in the increased air and water movement in the soil, and resulting improvement in turf conditions. AerWay 100 Series finetines are ideal for mid-summer use when play is heaviest. Plus, the optional built-in roller can be added to smooth the playing surface.



Equally at home on turf, sports fields, fairways, greens and tees, AerWay 100 Series finetines carve a neat 6" deep penetration to enhance air and water movement in soil. Surface disruption is so minimal that play can immediately follow the AerWay treatment.

AerWay 100 Series with Greens Express option

Aerate greens and tees anytime without disrupting play



Only AerWay lets you aerate 16 greens in about 3 hours, leaving a smooth, playable surface without cores.

Not only does AerWay let you aerate greens whenever you want, you'll pay thousands less than you would for a more complex machine. The built-in smoother smooths over aeration penetrations, making the surface instantly playable. The roller adjusts to produce varying depths of penetration up to 6".



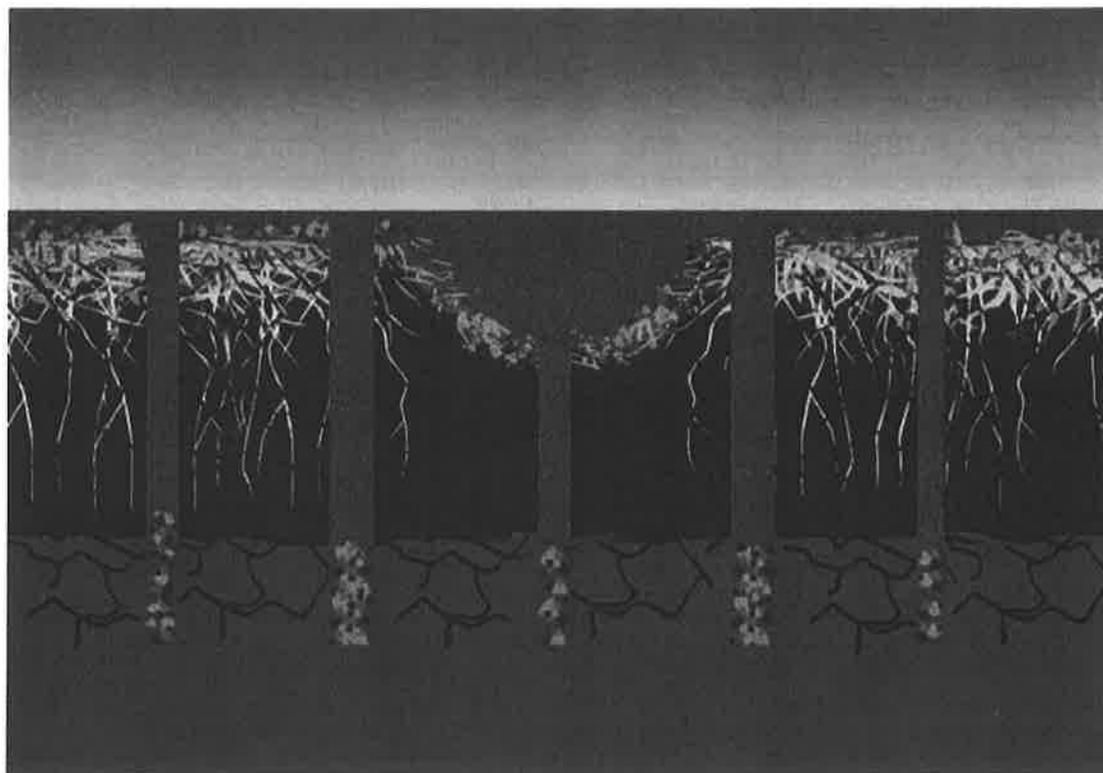
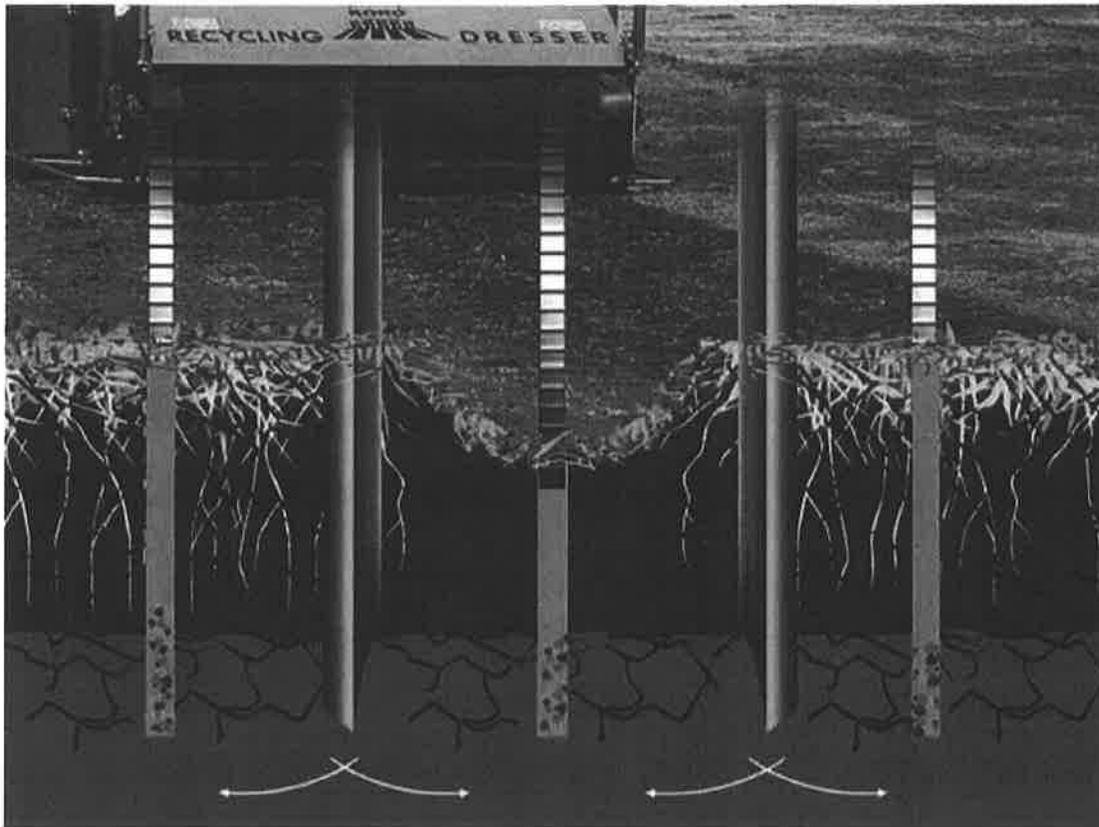
AerWay 100 Series Greens Express

- Built-in smoothing roller
- Instant greens playability with one or two passes
- Control aeration depth in 1/2" increments up to 6" or use the roller alone
- Three-point hitch models available
- Pneumatic turf tires on tag-along units

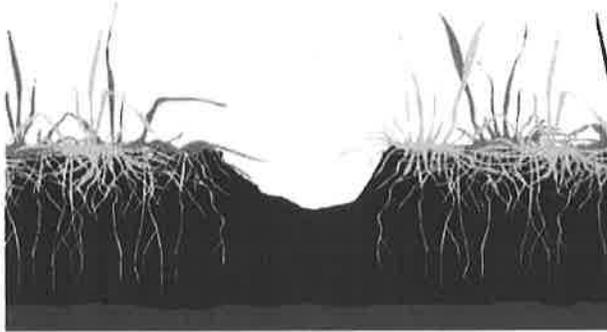
See you that the aeration hole? AerWay lets you give greens and tees the aeration care you want without closing your course or ever disrupting play. By the way, the aeration hole is beside the front of the putter.

AerWay Aerator





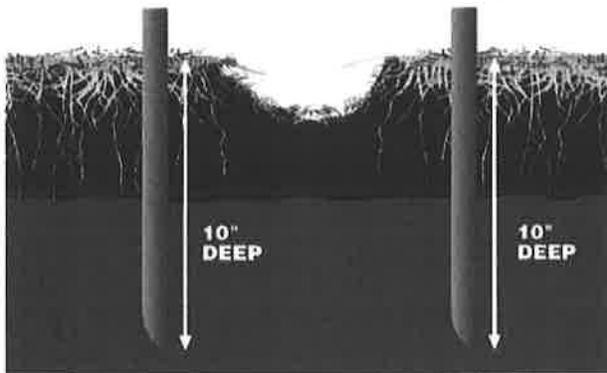
Recycling after Dragging



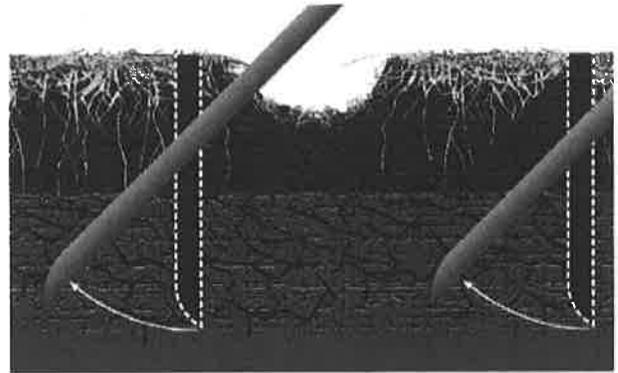
**Sports Field-Dormant/
Compacted**
3" Deep



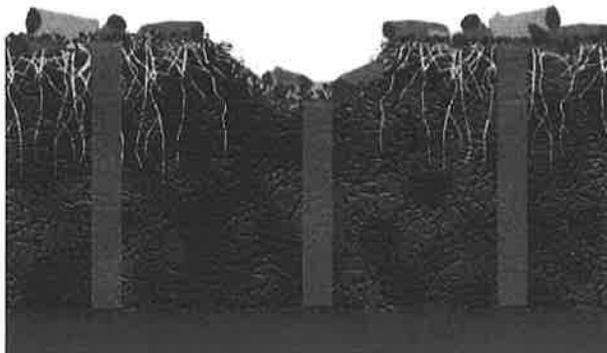
Mow Grass to 1/2"



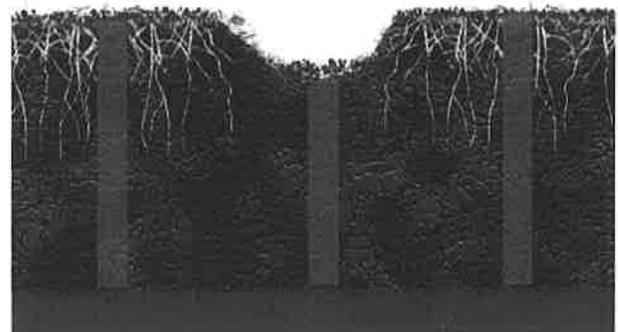
Deep Shatter Tine
10" Deep, 6" on center



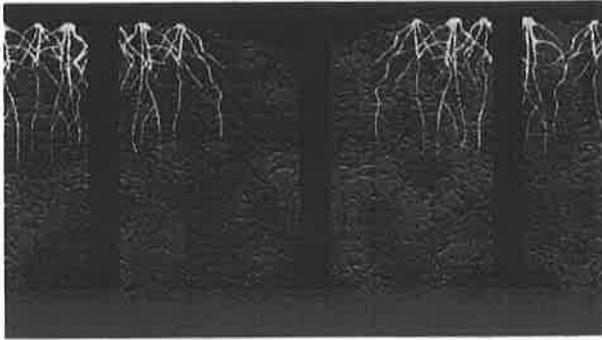
Deep Tine Showing Fracturing



Deep Tine Plug Pulling
10" deep, 6" on center

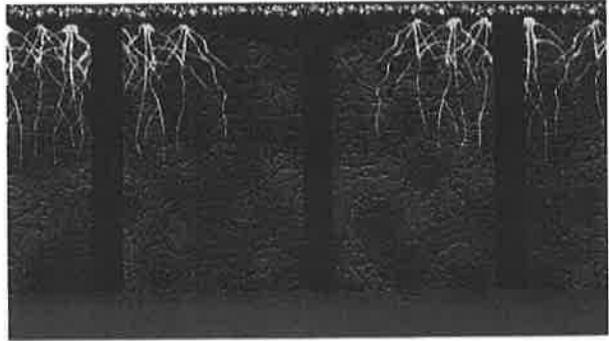


Plugs Removed from Field

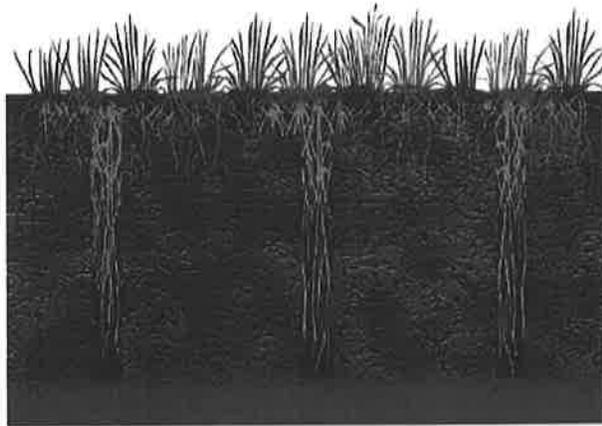


Top Dressing

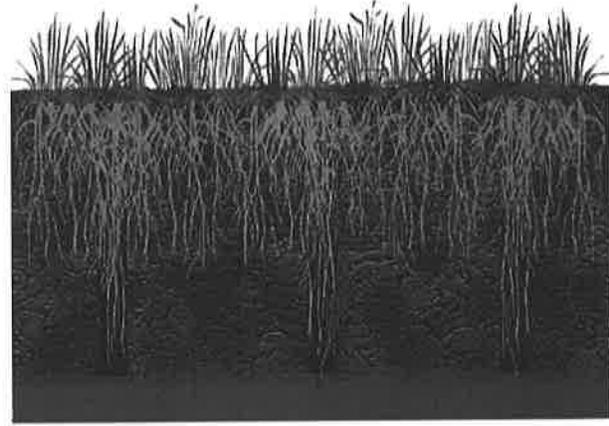
Use drag-mat 6-8 passes until filled



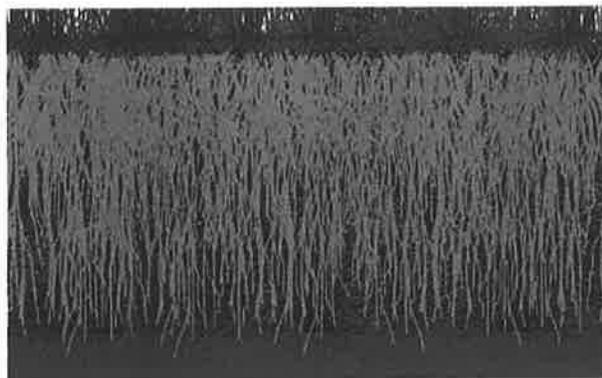
Overseed with Slit Seeder



Fertilize, Water and Mow



4 Weeks Later



8 Weeks Later

6. *Slit-seed in two directions. Do not broadcast seed as it can take twice as long for it to germinate when exposed to the changing weather at the surface.*
7. *If you deep tine aerate with the solid tines as in the earlier discussion, you should spread the top dressing first then deep tine through the top dressing. This pushes a lot of material into the holes. Also the weight of a heavy top dresser can compact the newly aerated and loosed soil and cut ruts in the field that will be filled with the top dressing as you drag the field.*

TOP DRESSERS

It is important that you carefully select a top dresser that fits your needs. If you put down a 1/4" top dressing, this would be 46 cubic yards of material on 60,000 square feet. If you purchase a 1 cubic yard top dresser, you will have to fill it 46 times to cover the entire field. A 4 cubic yard machine or larger is best. Also the machine should be capable of putting down up to 1/2" at a time or you will have to make several passes over the same spot. Make sure that your tractor will have enough power to pull the machine and put down 1/2" at a time.

One other major concern about top dressing is that it be screened to 1/4" minus, meaning that there is nothing larger than 1/4". This is essential because if you try to spread larger materials they will clog the spreader and even damage the moving portions of it.

The Tycrop TD-460 top-dresser (red machine on next page) can handle 4 cubic yards of a heavy sand top dressing and 5-7 cubic yards of a lighter composted material. It can put down up to 1" at a time in one pass, can be emptied in 18 seconds when used for transporting materials from one point to another and with the tailgate removed, can move a pallet into the bed for transport. It also has one of the lightest PSI (pressure per square inch) ratings in the industry. The bed is hydraulically driven and is operated separately from the ground speed. In other words you can increase the bed speed and slow down the ground speed to allow you to put down much more material per square foot with one pass.

The Koro Recycler Dresser (see picture on the next page) is very unique in the industry and has been used in Europe for many years to top dress sports fields with out bringing in expensive sand. This machine has 8" deep saw blades on 1' centers with powerful tines that rip 12" deep between the saw blades on 6" centers. The saw blades pull up root zone material into

City of Irvine

Soil Analysis

Soil Analysis (sand, silt, clay)

Soil testing is done to determine how much of each soil component is present in the soil. At the direction of the City Representative, the landscape contractor shall perform a predetermined soil and tissue analysis from the turf and/or planter areas. A soil test will provide the following:

1. ph level
2. organic %
3. Soluble Salts
4. Lime Content
5. Nitrogen ppm
6. Phosphorus ppm
7. Potassium ppm
8. Sulfur ppm
9. Calcium ppm
10. Magnesium
11. Sodium ppm
12. Zinc ppm
13. Iron ppm
14. Manganese ppm
15. Copper ppm
16. Cation Exchange Capacity (CEC)

Examples of a typical soils report are attached.

Sand as shown in the table is the largest of the three soil particles. It shows a greater range in size than either silt or clay (from very coarse to very fine). Sand has a small surface area relative to its weight, low water-holding capacity, and poor plant nutrient retention. The large size of sand particles creates large spaces between particles. Since sand particles don't stick together, they don't compact. Trying to compact a sand soil (one containing 70% or more sand) would be like trying to compact a basket of ping-pong balls. This is one reason why sand-based root zones are commonly used on sand based athletic fields and golf greens.

Silt particles are smaller than sand particles, so the space between particles is smaller, providing greater water holding capacity than sand. Silts have low to medium nutrient capacity, and they will stick together rather well because of a clayey surface coating. The properties of silt are intermediate between those of sand and clay.

Clay particles are the smallest of the three particles. Individual particles of clay will stay suspended in water and are not visible to the naked eye. Of the three particle types, they have the greatest surface area relative to their weight and the greatest nutrient-holding capacity. Since the space between clay particles is very small and their surface area is large, clays retain water strongly. Clay particles will stick together readily, so clay soils are very prone to compaction. Clays are categorized into two major groups. Montmorillonite clays (found in the Midwest and West) show considerable swelling and shrinking when wet and dried, respectively, and have excellent nutrient-retention properties. Kaolinite clays (found mostly in the East and Southeast) exhibit little swelling or shrinking and tend to have poor nutrient-holding properties.

Classifying soils according to texture

Most soils are mixtures of all three-particle types with organic matter. The ratios or amounts of each particle group largely determine the properties of the soil. The percentage of each particle can be determined by a mechanical analysis (sieve analysis). Then, using the Soil Textural Triangle shown on the following page, the soil can be classified into one of 12 categories. It's easy to use the textural triangle to determine soil types. First, locate the intersection of the lines representing each of the three particle types. Then follow the line at the same angle as the number on the scale you are using. For example, the soil depicted by point A in this figure is in the loam class, with 45% sand, 35% silt, and 20% clay.

With a little practice, the turf-grass manager can learn much about a soil from its feel. For example, this procedure outlined by Daniel and Freeborg can be used to evaluate the soil texture by feel:

The following table summarizes some of the primary properties influenced by soil texture.

SOME SOIL PROPERTIES INFLUENCED BY SOIL TEXTURE

SOIL PROPERTY	TEXTURAL CLASS		
	SAND	SILT LOAM	CLAY
Aeration	excellent	good	poor
Cation Exchange	low	medium	high
Drainage	excellent	good	poor
Erodibility*	easy	moderate	difficult
Permeability*	fast	moderate	slow
Temperature (spring)	warms fast	warms moderately	warms slowly
Tillage	easy	moderate	difficult
Water-holding Capacity	low	moderate	high
Resistance to Compaction	excellent	good	poor

* By water

Soil structure

Soils do not exist simply as a body of individual particles. The three types discussed above are present in the soil in distinct arrangements or soil structures. The type of arrangement varies with the ratio among the three particle types, the amount and type of organic matter present, water availability, and temperature. The clumping of the mineral particles into clusters or aggregates is very important in terms of water movement, aeration, and heat transfer in the soil.

A simple crumb-like aggregate will range in size from 0.25 to 0.5 inch in diameter. The arrangement of these aggregates is such that they are separated from each other by a pore space. A soil with good structure has two classes of pores. The large pores are filled with air, while the small pores are filled with water. Sandy soils have many large pores while clays have few large pores but many small pores. Therefore, sandy soils exhibit excellent water and air movement into and through the profile, while the movement of water and air through clay soils will be much slower. However, because of their lack of small pore spaces, sandy soils have poor water-holding capacity. Foot traffic and other forms of pressure exerted on the soil may eliminate both large and small pores by compacting the soil and destroying its structure. In such a situation turf-grass growth will be poor because of the limited pore space available for air (needed by the roots) and water. In addition, the turf-grass manager can affect soil structure through cultivation practices, drainage, and adding soil amendments. Tilling or cultivating a clayey soil when too wet can destroy its structure.

Organics

SOIL ORGANICS

They:

- *Help prevent compaction*
- *Add Billions Of Microbes, Bacteria That Break Down Fertilizer*
- *Cause Turf To Go Dormant Later & Green Up Quicker In The Spring*
- *Help To Control Diseases*
- *Provide Dark Green Color*

For Disease Control-

- *They Bio-stimulate Native Populations of Soil Organisms to Prevent Diseases*
 - *Contain Suppressive Micro-organisms*
 - *Suppress Root Infecting Pathogens-Dollar Spot, Brown Patch, Pythium Blight, Necrotic Ringspot, Red Thread, Typula Blight*
 - *Control Through Top-dressing Would Require yearly Applications by top dressing.*
 - *Root-zone Incorporation Can Provide Up to 4 years of Disease Suppression*
-

3. *Sawdust*: can be a cheap source of organics if it is from the right kind of tree. Sawdust from pine trees or evergreens is not good because it contains a pitch that is a toxin to plants. This pitch will have an effect on plants even after it has passed through the composting process. Aspen sawdust is an excellent source of organics after it has been aged at least three years. Before this time, the sawdust will require large amounts of nitrogen to break down to the form where the plants can begin to use it.

4. *Sewer sludge*: another source of organics and is becoming more and more available as cities begin to look for ways to dispose of this by-product. It normally has higher levels of nutrients than some other forms of organics, but it usually is high in salts and heavy metals. The metal levels can be high enough to cause some problems when they combine with the metals already in the soil. Toxic levels of some of these metals can be reached long before you have enough of this material to supply the nitrogen, phosphorus, or potassium levels needed by the plants. The EPA now has two categories of compost: class A and class B. Class A has a much lower fecal bacteria count and thus is the product of choice. Class B is much easier to find, but the EPA normally wants to know where every pound of this material has been placed and wants a soil analysis before and after applying it to turf or crops. By itself, sludge is very hot (salts & metals); that is, it can burn plants and retard new seed. It is more often used in compost and mixed with top soil, sawdust, or peat.

5. *Compost*: the most rapidly growing source of organics is being manufactured by cities, golf courses, schools, sewer plants, and feedlots. Composting is the process of combining several sources of organics including all of the above, as well as grass clippings, food by-products, recycled newspapers and magazines, removed thatch, mulched tree limbs and even chewed up old wood shingles. If turned properly in the sun and composed of the right mixture and moisture, compost temperatures will reach 135-145 degrees in the center of the pile. This will kill weed seed and pathogen bacteria, but must be turned evenly and often to insure that there are not some cool spots where the process was not completed. By the time these are diluted, you end up with an organic content of 15-25%.

You should have an analysis of your soil and the organics you intend to use on this area BEFORE purchasing or applying it to your turf. High salt or high pH content compost should not be used on soils that are already high in

SOIL ANALYSIS

Send To : Merchants Landscape Service, Inc. 1510 S. Lvon Street Santa Ana CA 92705	Project : Cypress Grove Park	Report No : 16-272-0005 Cust No : 02661 Date Printed : 10/03/2016 Date Received : 09/28/2016 Page : 1 of 2 Lab Number : 03246
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Sample Id : **Field #1**

SATURATION EXTRACT - PLANT SUITABILITY

Test	Result	Effect on Plant Growth				
		Negligible	Sensitive Crops Restricted	Many Crops Restricted	Only Tolerant Crops Satisfactory	Few Crops Survive
Salinity (ECe)	4.4 dS/m	[Bar chart showing 4.4 dS/m in Sensitive Crops Restricted]				
Sodium Adsorption Ratio (SAR) *	6.64	[Bar chart showing 6.64 SAR in Sensitive Crops Restricted]				
Boron (B)	0.56 ppm	[Bar chart showing 0.56 ppm in Negligible]				
Sodium (Na)	29.0 meq/L	[Bar chart showing 29.0 meq/L in Many Crops Restricted]				
Chloride (Cl)						
Carbonate (CO3)						
Bicarbonate (HCO3)						
Fluoride (F)						

* Structure and water infiltration of mineral soils potentially adversely affected at SAR values higher than 6.

Test	Result	Strongly Acidic	Moderately Acidic	Slightly Acidic	Neutral	Slightly Alkaline	Moderately Alkaline	Strongly Alkaline	Qualitative Lime
pH	7.7 s.u.	[Bar chart showing 7.7 s.u. in Neutral]							Low

EXTRACTABLE NUTRIENTS

Test	Result	Sufficiency Factor	SOIL TEST RATINGS					NO3-N
			Very Low	Low	Medium	Optimum	Very High	
Available-N	28 ppm	0.6	[Bar chart showing 28 ppm in Low]				19 ppm	
Phosphorus (P) - Olsen	14 ppm	0.5	[Bar chart showing 14 ppm in Low]				NH4-N 9 ppm	
Potassium (K)	226 ppm	1.1	[Bar chart showing 226 ppm in Medium]					
Potassium - sat. ext.	1.0 meq/L						Total Exchangeable Cations(TEC) 161 meq/kg	
Calcium (Ca)	2360 ppm	0.9	[Bar chart showing 2360 ppm in Medium]					
Calcium - sat. ext.	23.7 meq/L							
Magnesium (Mg)	507 ppm	1.4	[Bar chart showing 507 ppm in Medium]					
Magnesium - sat. ext.	14.4 meq/L							
Copper (Cu)	1.6 ppm	0.8	[Bar chart showing 1.6 ppm in Low]					
Zinc (Zn)	2 ppm	0.3	[Bar chart showing 2 ppm in Very Low]					
Manganese (Mn)	7 ppm	0.4	[Bar chart showing 7 ppm in Low]					
Iron (Fe)	37 ppm	0.5	[Bar chart showing 37 ppm in Low]					
Boron (B) - sat. ext.	0.56 ppm	1.9	[Bar chart showing 0.56 ppm in Low]					
Sulfate - sat. ext.	44.9 meq/L	15.0	[Bar chart showing 44.9 meq/L in Very High]					
Exch Aluminum								

Cu, Zn, Mn and Fe were analyzed by DTPA extract.

PARTICLE SIZE ANALYSIS

Half Sat	Organic Matter	Weight Percent of Sample Passing 2mm Screen							USDA Soil Classification
		Gravel Coarse 5-12 Fine 2-5	Sand Very Coarse 1-2 Coarse 0.5-1 Med. to Very Fine 0.05-0.5	Silt .002-.05	Clay 0-.002				
24 %									

City of Irvine

**Irrigation
Water Analysis**

Irrigation Water Analysis (Water Management)

The purpose of a water analysis is to show the minerals and nutrients that are in the irrigation water. The City of Irvine irrigates all their sport fields with recycled water. This is accomplished through the use of centrally controlled irrigation controllers. The staff uses evapotranspiration data to adjust the watering schedules to meet the Irvine Ranch Water District's allocation and avoid water over use penalties. They set the irrigation controller's schedules based upon plant type, soil type, sprinkler type, crop coefficient, slope, and sun exposure.

The landscape maintenance contractor checks and inspects all components of the irrigation system, from the valves to the sprinkler heads, every 14 days. Any malfunctions or leaks are repaired the same day.

Water Management (Cal Sense): Through the use of centrally controlled irrigation controllers the Landscape Division has efficient management of water usage. The athletic sport parks maintenance staff uses evapotranspiration data to adjust the watering schedules to meet the Irvine Ranch Water District's (IRWD) allocation and avoid water over use penalties. Evapotranspiration is the combination of evaporation and transpiration. Evaporation is the loss of water from the soil and transpiration is the loss of water from the plant. Although it is difficult to forecast water usage due to factors such as rainfall amounts, the staffs utilizes rainfall histories in its water management strategies. This highly technical and daily task is vital to the landscape's health and in adhering to the water budget. The goal is to apply the least amount of water necessary to maintain healthy plant material. City Landscape staff utilize Smart controller technology, weather data and weekly field observations to accurately water the sport fields and landscape. They set the irrigation controller's schedules based upon plant type, soil type, sprinkler type, crop coefficient, slope, and sun exposure. The settings are adjusted so that irrigation does not exceed IRWD's water allocation. Staff monitors the Smart controllers to respond to alerts and system failures.



Anaheim office
Lab No: 17-097-0008
April 17, 2017

Merchants Landscape Services, Inc.
1510 S. Lyon Street
Santa Ana, CA 92705

Attn: Edgar Valdovinos

HERITAGE PARK- RECYCLED MUNICIPAL WATER

Attached are the results of the analysis performed on a water sample that was received by our laboratory on April 07, 2017. This sample was analyzed to determine its suitability for irrigation.

Analytical Results:

Salinity (EC_w) is slightly elevated at 1.15 dS/m, which is in the range typical of re-claimed water.

Sodium was measured at 4.75 milliequivalents per liter (meq/l). This could cause salt sensitive plants to develop leaf burn if sprinkler irrigation is used. Sodium is properly balanced by calcium and magnesium, as indicated by the safely low adjusted sodium adsorption ratio (SAR_{adj}) of 4.75.

Boron is safely low at 0.28 mg/L.

The reaction of the water is slightly alkaline at 7.1 on the pH scale. Bicarbonate is not problematically high although lime deposits will form where water evaporates. Iron and manganese levels are safely low. There is very little magnesium in this water.

Comments

This water is of acceptable quality for irrigation purposes. Based on the slightly elevated sodium and chloride in the water, overhead irrigation should be avoided on sensitive woody plant material. This would only be of particular concern if the plants are showing any signs of tip and marginal burning.

If we can be of any further assistance, please feel free to contact us.

A handwritten signature in dark ink, appearing to read "J. Kiefer", is written over a light-colored background.

Joe Kiefer

IRRIGATION WATER

Send to : Merchants Landscape Service, Inc. 1510 S. Lyon Street Santa Ana , CA 92705	Project : Heritage Park	Report No : 17-097-0008 Cust No : 02661 Date Printed : 04/11/2017 Date Received : 04/07/2017 Page : 2 of 2 Lab Number : 89401
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Sample Id : **Recycled Municipal Water**

WATER ANALYSIS INTERPRETATION, AGRICULTURAL

Potential Problem	Units	Test Result	Degree of Restriction on Use			Graphical Results		
			None	Slight to Moderate	Severe	None	Slight to Moderate	Severe
Salinity ECw ¹	dS/m	1.15	< 0.7	0.7 - 3	> 3			
Specific Ion Toxicity								
Sodium (Na)¹								
Surface irrigation	SARadj	4.75	< 3	3 - 9	> 9			
Sprinkler irrigation ²	meq/L	6.05	< 3	3 - 6	> 6			
Chloride (Cl)¹								
Surface irrigation	meq/L	3.86	< 4	4 - 10	> 10			
Sprinkler irrigation ²	meq/L	3.86	< 3	3 - 5	> 5			
Boron (B)¹	mg/L	0.28	< 0.7	0.7 - 3	> 3			
Fluoride (F)¹	mg/L	0.70	< 1	1 - 5	> 5			
Clogging of Drip Systems or Unsightly Residues								
Iron (Fe) ³	mg/L	0.05	< 0.3	0.3 - 1.5	> 1.5			
Manganese (Mn) ³	mg/L	0.03	< 0.2	0.2 - 1.5	> 1.5			
pH - pHc ⁴		0.71	<= 0	> 0				
Reduced Water Infiltration⁵ (Ratio based on adjSAR / ECw)		4.13	< 4	4 - 10	> 10			
Alkalinity								
Bicarbonate (HCO ₃) + Carbonate (CO ₃) ⁶	meq/L	3.39	< 2	2 - 8.5	> 8.5			
Potential Low Nutrient Issues (Soilless media)⁷								
Sulfate	mg/L	130	> 48	48 - 20	< 20			
Magnesium	mg/L	17	> 10	10 - 4	< 4			
Boron	mg/L	0.28	> 0.3	0.3 - 0.05	< 0.05			

1. Crop tolerance to salinity, sodium, chloride, boron and fluoride varies widely. Most tree crops are sensitive to sodium and chloride while many annual crops are not. Soil conditions, irrigation method and climate must be considered.
2. Leaf burn from foliar and root absorption will be enhanced under conditions of : low humidity, high temperature and high air movement .
3. Elevated iron in combination with sulfides or tannins can result in bacterial slimes that can clog drip systems. Removal of iron and manganese often involves oxidation (aeration or chlorination) followed by filtering.
4. Positive pH - pHc (saturation index) values indicate the potential for calcium and magnesium carbonate precipitates that might impair efficiency of irrigation systems with small orificed parts and/or may leave unsightly lime deposits on leaves. Problems can be reduced by mineral acid addition.
5. Infiltration problems are most likely when water with low ECw and/or high SAR adj. is used on mineral soils containing some silt and clay. Evaluation of infiltration problems should include analysis of both irrigation water and soil-water extracts. Treatment may involve injecting gypsum into the water or applying gypsum to the soil surface.
6. Bicarbonate when excessive may result in difficulty in controlling soil pH and may impair root assimilation of minor elements.
7. Sulfur, magnesium and /or boron may become limiting if not supplied by soil or fertilizer. Use soil and leaf analysis to confirm need.

Comments :

City of Irvine

Fertilization

Annual Schedule Turf Management	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Aerification	Blue					Blue		Blue			Blue	
Slicing/Spiking Aerator			Brown									
Verticutting/Dethatching				Yellow								
Verti-drain/Deep tine					Orange							
Sand top dressing					Pink							
Over seeding/Inter seeding		Black										
Compost top dressing							Red					
Sod Installation							Green					
Mowing	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Soil Analysis			Dark Blue			Dark Blue			Dark Blue			Dark Blue
Irrigation Water Analysis			Dark Blue						Dark Blue			
Annual Field Maint. Closure 7/3 to 9/8							Grey	Grey	Grey			

Annual Schedule Fertility- Liquid	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Suma Gro	Brown								Brown		Brown	
Arable One						Yellow	Yellow					
Great Eight (1-0-0)				Orange	Orange							
Emerald Green (8-4-8)		Dark Blue						Dark Blue				
EZ Wet Soil Penetrant			Blue							Blue		Blue

Annual Schedule Fertility- Granular	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
JTM w/ Sea Kelp (8-2-7)								Yellow	Yellow	Yellow		
JTM Activator Calcium (8-2-7)			Orange	Orange								
Live Earth (8-2-4)	Green	Green									Green	Green
Humate Soil Conditioner					Blue							
Tri-C Humate						Red						
Tri-C Myco							Dark Blue					

Fertilization

Fertilization does more to improve poor quality turf grass or to maintain good quality turf grass than any other management practices. Proper fertilization practices produce a dense, medium to dark green turf that resists pests and environmental stresses. Successful turf maintenance fertilization requires that you assess your turf's nutritional requirement through a soil analysis report, understand fertilizers, know how much to apply and when, and use proper application technique.

There are two types of fertilizers: Liquid vs. Granular.

Liquid Fertilizer: This type of fertilizer is formulated and packaged as a liquid and includes clear liquids (solutions) and liquids that contain suspended solids (suspension fertilizers). Nutrients are already in solution, which means they are also immediately available to the plant. While the plant's root system absorbs most nutrients there's also a very small amount can be taken in through the leaves resulting in a quick green up within days of the application. Liquid application usually has better coverage which can better fight weeds. Since the nutrients are already in soluble form, most of them are readily available to the plant. They are fast release supply of nutrients which initially produces good results but won't last as long as granular.

Granular Fertilizer: Granular fertilizers are dry particles that manufacture size between an upper and lower limit of screen sizes. They may be finely crushed, granular, crystalline, powder or processed into uniform prills. They can have a controlled release mechanism which might make the initial green up to take a little longer but the results will likely last much longer. Granular can also accomplish more per application. Although some granular fertilizers can burn lawns if not properly administered, slow releasing granular can be the perfect medicine for lawns battling hot, dry conditions since they slowly feed a lawn and avoiding burning. Each application can take much more time. This is because

you'll likely take two trips over the sport field and more time will be spent cleaning up the granules from the pavement surfaces and sweeping them back onto the turf.

The following lists of fertilizers are utilized in our sport fields:

Fertilization

LIQUID vs GRANULAR FERTILIZER

Granular fertilizer is the most common fertilizer on the market today. Granular fertilizer is also the least expensive of all fertilizers on the market for delivered nitrogen levels. Before the invention of the modern chemical fertilizer, the only source of these nutrients was animal manures and composted plants. The manure's level of nutrients was very low and it was very high in salt. The fresher the manure was the higher the nutrient level but also the higher salt level.

Today when we hear of using all organic fertilizer the cost prohibits getting enough nutrients on a site of any size by using compost or manures as exclusive source of nutrients. The cost of hauling is the major expense as well as finding and bringing enough of these manures to a site to give it all that it needs. If manure is readily available it can supply all the needs for an agricultural application if the distances are short and more happens to be on site already. The word "organics" seems to stir something within us and brings back memories of things old fashioned, of good times, Mom, and apple pie. Contrast this with inorganic fertilizers, which are chemicals as they're called and this sounds harsh by comparison. In reality, inorganic fertilizers have revolutionized the world as far as food production because it is possible to isolate one particular nutrient. The percentages of any one nutrient can be raised very high to bring down the total cost of production dramatically.

Granular fertilizers are easier spread. The fancier spreaders have a calibration of so many pounds per thousand square feet. When fertilizing with granules it is important that you put on half the material in one direction and then crisscross 90 degrees with the rest of the product. This will ensure that you don't have colored strips down the middle of your field. Some granular fertilizers are very hot or will volatilize easily as we learned in the early discussion. When nitrogen volatilizes it is the ammonium flashing as ammonia gas, which then burns the plant as it flashes and is no longer available to the plant. Higher salt content nitrogen fertilizers are also responsible for contributing to the salt build up on a clay soil. Also, high nitrogen granular fertilizers can cause thatch if used in excess.

COMPARISON OF MAJOR SOURCES OF NITROGEN

NITROGEN SOURCES	APPLIC. INTERVALS	HYDROLYSIS RELEASE	MICROBIAL RELEASE	BURN POTENTIAL	SALT INDEX	LEACHING POTENTIAL	VOLITL. POTENTIAL	COST
QUICK RELEASE								
UREA-45%	2-4 WEEKS	YES	NO	VERY HIGH	MEDIUM	HIGH	HIGH	LOW
AMM.-35%	2-4 WEEKS	YES	NO	VERY HIGH	HIGH	HIGH	HIGH	LOW
NITRATE								
AMM.-32%	2-4 WEEKS	YES	NO	VERY HIGH	HIGH	HIGH	HIGH	LOW
SULFATE								
SLOWER RELEASE								
SCU -32-38%	4-8 WEEKS	YES	NO	LOW	HIGH	HIGH	LOW	HIGH
(sulf. coat urea)								
PLASTIC/RESIN COATED-UREA	4-8 WEEKS	YES	NO	LOW	HIGH	HIGH	LOW	HIGH
CONTROLLED RELEASE								
IBDU* -31%	12-16 WEEKS	YES	NO	LOW	LOW	LOW	LOW	HIGH
UREAFORM-38%	12-16 WEEKS	NO	YES	LOW	LOW	LOW	LOW	HIGH
METHYLENE UREA -40%	12-16 WEEKS	YES	YES	LOW	LOW	LOW	LOW	HIGH
CALREA-22%	14 WEEKS	NO	NO	NONE	LOW	NONE	NONE	HIGH
CALCIUM CHLORIDE & UREA								

* ISOBUTYLIDENE DIUREA

do tend to burn, volatilize, or leach, require careful attention to the amount that you apply at one time. These three fertilizers contribute more to growing thatch than anything else. They give such a boost to the plant that it is so busy growing top growth and creating hay and thatch that the roots are not able to grow.

Normally, you want to be applying no more than .5 lb./1,000 sq. ft. of quick release fertilizer in early spring. This is because if you over-stimulate with these products in early spring, you can cause disease problems in the plant later. Also, you will have a natural growth in the spring from the low pH rainfall. In May and June, you can apply as much as 1 lb./1,000 sq. ft. if necessary. In July and August with the hot weather, you should not reapply more than .5 lb./1,000 sq. ft. In late August and September, you can again apply up to 1 lb./1,000 sq. ft. if needed. With the controlled release SCU fertilizers, you must again re-fertilize before it turns brown which may mean fertilizing every 5 to 6 weeks. The problem with the slower release SCU's is that they are not controlled released and, therefore, no matter when you put them on, you will have a quick boost when they first hit the soil and then they will release at a different rate throughout the rest of its release period. The controlled release fertilizers release fairly evenly through the entire 12-14 week period. This is equivalent to our own eating, in that it would not be good for us to stuff ourselves and then not eat for some time and then stuff ourselves again. It is much better to eat smaller amounts over a longer period of time. This is exactly what controlled release fertilizers do.

UF (ureaformaldehyde)

This slow-release material is formed by a reaction between urea and formaldehyde. The release of nitrogen is dependent on microorganism breakdown of this compound. Since microorganism activity is stimulated by warm soil temperatures, the nitrogen release rate of urea formaldehyde is also very temperature-dependent. For example, microorganism degradation of the fertilizer is minimal at low or cool soil temperatures such as those that occur in the winter and early spring. During these times turf grass response will be minimal. Other factors that affect microorganism activity, such as soil pH, soil moisture, and soil oxygen, will also affect the nitrogen release rate of UF.

ACID/CALCIUM BASED CONTROLLED RELEASE LIQUID FERTILIZER

	N	P	K	Ca	pH	Lbs./Gal	lbs N/Gallon	Gals. = 1 lb.
N								
Nitro	22	0	0	7	3.3	11.2	2.576	.39
Phos	7.5	15	0	2.1	<1	10.8	.81	1.234
Complete	8	2	8	2	5	9.6	.77	1.3
Leach	5	0	0	12	7	11.6	.58	1.72

Nitro *Best used for quickly establishing new sod or seed and quickly healing damaged turf*

Recommended rates:

Normal application	.39 gallons/1000 sq. ft.	3-6 applications per year
Quick mending application	.58 gallons/1000 sq. ft.	First application

Phos *Low pH (>1) makes all of this phosphorus immediately available in high pH soils*

Recommended rates:

Incorporation into new fields	1 gallon/1000 sq. ft.
Normal application	.15 gallons/1000 sq. ft.

Complete *Used mainly for incorporation when potassium is lacking in under-construction fields*

Recommended rates: As needed

Leach *This product will help lower high sodium levels in the soil*

Recommended rates:

After heavy aeration	1 gallon/1000 sq. ft. followed by 1" of water
----------------------	---

SCU (sulfur-coated urea)

This slow-release fertilizer is made by covering urea granules with sulfur, and then a thin coating of a wax sealant. Nitrogen is released when microbes break down the wax and water moves through the small pores in the sulfur coating into the particle to dissolve the urea. The movement of water into the particle causes pressure to build, nitrogen escapes gradually through the coating or the particle breaks down completely, releasing all its nitrogen. Varying thicknesses of the sulfur coating on the urea granules result in different breakage times, thus providing a slow release. High soil temperatures and moist soils favor nitrogen release from SCU. One disadvantage of SCU is that the sulfur coating is quite fragile. The coatings are often broken during transport and application of the fertilizer.

Polymer Coatings

This is the newest technology in slow-release nitrogen fertilizers. The principle involves covering a soluble nitrogen source such as a urea granule with a polymer membrane. Some manufacturers offer a polycoated SCU. Water moves through the polymer micropores, dissolving the urea granule inside. The polymer membrane then controls the amount of nitrogen released from the particle. Water, temperature, and the coating thickness determine the rate of release. High temperatures and thin coating result in faster nitrogen release. Currently, polymer-coated fertilizers are being used mostly on golf course turf.

CALREA

Calrea is a controlled release liquid fertilizer developed by Texas A&M University. It is an acid/calcium based liquid with a pH of from 1-4 depending on the fertilizer nutrient mix. The calcium is an available source, which is the catalyst that keeps this material in clay soils up to 10 weeks. The low pH of the material has the affect of farming the nutrients that are tied up by the high pH soil. This farming affect gives the plants a dramatic improvement in every aspect of growth. In other words, we get deep roots, stiffer stalks, and healthier plants, as well as heavier, faster top growth, and faster spreading of Turfgrass ryzomes and stolons. We also found that CALREA tends to break down thatch by encouraging the microbes that go after the thatch. Another unique factor we discovered about CALREA was that it leaches salt out of the soil. Several athletic fields in the mountains had continuing problems with elk and deer urine killing large spots in the soil. When these areas were sprayed

Great 8™ 1-0-0

Liquid Humic Acid With Norwegian Sea Kelp

Guaranteed Analysis:

Total Nitrogen (N).....1.00%
Ammoniacal Nitrogen.....1.00%

Derived from: Humic shale ore

ALSO CONTAINS NON-PLANT FOOD
INGREDIENTS:

8% Humic Acids derived from humic shale.
1% Norwegian Sea Kelp

Directions for Use: Do not apply undiluted.
For professional and home/garden use.
Turf & Ornamentals
Initial application rate, 8 to 12 oz. Per 1,000 Sq ft.

Apply monthly at a rate of 4 to 8 oz per 1,000
Sq. Ft. Can be safely mixed with most fertilizers.

Trees: Drenching and deep root feeding: Dilute with
water 40:1. Use at initial planting and then include as
part of regular fertilization program.
Use 5 gallons of dilute per 1" DBH.

LOT# 326462-00 ISS
2.5 Gallons (9.46 L)

Live Earth®
PRODUCTS

400 S 200 E
Emery, UT. 84522
(435) 286-2222

Limited Warranty: Live Earth Products warrants that this product conforms to the guaranteed analysis. Liability of Live Earth Products is limited to replacement of any product which does not meet these specifications. Buyer assumes all associated risks and Live Earth will not be held liable for property damages or personal injury resulting from the use, storage, or handling of this product.

Information regarding the contents and levels of metals in this product is available on the internet at <http://www.aapfco.org/metals.htm>

Keep out of the reach of children.
May be harmful if swallowed.
Do Not Freeze.
Shake well before use.



Great 8™ 1-0-0

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May be harmful if swallowed.
Do Not Freeze.
Shake well before use.



Humate Soil Conditioner™

Guaranteed Analysis:

Sulfur (S).....1.50%
Iron (Fe)2.25%

Derived from: Humic shale

ALSO CONTAINS NON-PLANT FOOD
INGREDIENT:

45% Humic Acids derived from humic shale.

Directions for Use: Apply Only as Directed

- For all turf and ornamentals, apply 10-15 lb per 1,000 sq. ft.
- Water in after application.
- Product may take several irrigation cycles to completely dissolve, use accordingly on non-aerified putting surfaces.
- Preplant applications may be applied at rates up to 1 ton per acre.
- Use 5-8 lbs per yard in planting mixes.
- Apply quarterly or as needed.

LOT# TM6475
Net Wt 50 lb (22.7 kg)

LiveEarth®

PRODUCTS

400 S 200 E

Emery, UT. 84522

(435) 286-2222

OMRI™
Listed

Limited Warranty: Live Earth Products warrants that this product conforms to the guaranteed analysis. Liability of Live Earth Products is limited to replacement of any product which does not meet these specifications. Buyer assumes all associated risks and Live Earth will not be held liable for property damages or personal injury resulting from the use, storage, or handling of this product.

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Keep out of the reach of children.
May be harmful if swallowed.
Store in a cool, dry location.



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- Product may take several irrigation cycles to completely dissolve, use accordingly on non-aerified putting surfaces.
- Preplant applications may be applied at rates up to 1 ton per acre.
- Use 5-8 lbs per yard in planting mixes.
- Apply quarterly or as needed.

LOT# TM6475
Net Wt 50 lb (22.7 kg)

LiveEarth®

PRODUCTS

400 S 200 E

Emery, UT. 84522

(435) 286-2222

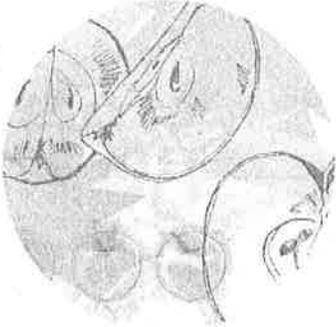
OMRI™
Listed

Limited Warranty: Live Earth Products warrants that this product conforms to the guaranteed analysis. Liability of Live Earth Products is limited to replacement of any product which does not meet these specifications. Buyer assumes all associated risks and Live Earth will not be held liable for property damages or personal injury resulting from the use, storage, or handling of this product.

Information regarding the contents and levels of metals in this product is available on the internet at <http://www.aapfco.org/metals.htm>

Keep out of the reach of children.
May be harmful if swallowed.
Store in a cool, dry location.





OMRI Listed®

The following product is OMRI Listed. It may be used in certified organic production or food processing and handling according to the USDA National Organic Program Rule.

Product
Live Earth® Soil Conditioner

Company
Live Earth Products, Inc.
Mr. Russell Taylor
400 South 200 East
Emery, UT 84522

Status
Allowed

Category
NOP: Humates

Issue date
21-Oct-1999

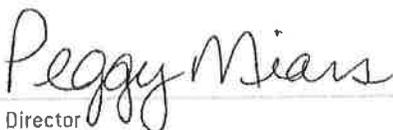
Product number
lep-9128

Class
Crop Fertilizers and Soil Amendments

Expiration date
01-Dec-2016

Restrictions

Not applicable.


Executive Director

Product review is conducted according to the policies in the current *OMRI Policy Manual*® and based on the standards in the current *OMRI Standards Manual*®. To verify the current status of this or any OMRI Listed product, view the most current version of the *OMRI Products List*® at OMRI.org. OMRI listing is not equivalent to organic certification and is not a product endorsement. It cannot be construed as such. Final decisions on the acceptability of a product for use in a certified organic system are the responsibility of a USDA accredited certification agent. It is the operator's responsibility to properly use the product, including following any restrictions.



Organic Materials Review Institute
P.O. Box 11558, Eugene, OR 97440-3758, USA
541.343.7600 • fax 541.343.8971 • info@omri.org • www.omri.org

MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT / COMPANY IDENTIFICATION				HMIS HAZARD RATING	
IDENTITY Emerald Green	HEALTH	2	0= INSIGNIFICANT		
	FLAMMABILITY	0	1=SLIGHT	3=HIGH	
	REACTIVITY	1	2=MODERATE	4=EXTREME	
MANUFACTURER'S NAME Live Earth Products, Inc. 400 S. 200 East Emery, Utah 85422	EMERGENCY: 1-800-846-2817 INFORMATION: (435)286-2222	DISTRIBUTOR'S NAME	INFORMATION:		DATE PREPARED: 6 March 2007 SUPERSEDES:

SECTION 2-HAZARDOUS INGREDIENTS / IDENTITY INFORMATION
INGREDIENTS
 Urea, mono-ammonium phosphate, ammonium sulfate, potassium nitrate, iron chloride, manganese, zinc and copper sulfates.
 Activity: 8.0%N, 4.0% P, 8.0% K pH 6.4

SECTION 3- PHYSICAL/CHEMICAL CHARACTERISTICS			
BOILING POINT 126 degrees C	SPECIFIC GRAVITY 1.19 g/cm3	VAPOR DENSITY(Air = 1) N/A	SOLUBILITY IN WATER Good
VAPOR PRESSURE (MM Hg.) 10 m-bar	MELTING POINT minus 21 degrees C	EVAPORATION RATE (Butyl Acetate = 1) N/A	

APPEARANCE AND ODOR
 Emerald Green Liquid/Odor: Light metallic odor

SECTION 4 - FIRE AND EXPLOSIVE HAZARD DATA					
FLASH POINT N/A	METHOD N/A	FLAMMABLE LIMITS N/A	LEL N/A	UEL N/A	EXTINGUISHING MEDIA N/A
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A			SPECIAL FIRE FIGHTING PROCEDURES N/A		

SECTION 5 - REACTIVITY DATA			
STABILITY	STABLE	CONDITIONS TO AVOID N/A	HAZARDOUS DECOMPOSITION OR BYPRODUCTS N/A
HAZARDOUS POLYMERIZATION	WILL NOT OCCUR	CONDITIONS TO AVOID N/A	INCOMPATIBLY N/A

SECTION 6 - HEALTH HAZARD DATA			
ROUTE(S) OF ENTRY - SIGNS AND SYMPTOMS OF EXPOSURE		EMERGENCY AND FIRST AID PROCEDURES	
INHALATION: NO		N/A	
EYES: YES		Immediately flush with water for at least 15 minutes.	
SKIN: YES		Call Physician if symptoms persist.	
INGESTION: YES		Wash contaminated areas with plenty of water. Remove contaminated clothing and wash before reuse. If skin irritation continues consult a physician.	
CARCINOGENICITY N/A		NTP N/A	IARC N/A
		OSHA REGULATED N/A	

MEDICAL CONDITIONS-GENERALLY AGGRAVATED BY EXPOSURE:

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
 Use an absorbant material to collect spill. Collect and dispose of in accordance with all Local, State and Federal regulations.

WASTE DISPOSAL METHOD
 Triple rinse and puncture containers after use.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
 Shake well before use. Do not attempt to reuse container

OTHER PRECAUTIONS
 Keep material in a temperate environment. Do not expose to direct sunlight. Exposure can cause swelling of container and possible breakage.

SECTION 8 - CONTROL MEASURES				
RESPIRATORY PROTECTION NIOSH/MSHA approved for mists. Employ respiratory protection when exposure to mist and spray is possible				
VENTILATION Use in open areas.	LOCAL EXHAUST N/A	OTHER N/A	SPECIAL N/A	MECHANICAL (GENERAL) Usually adequate
PROTECTIVE GLOVES YES	EYE PROTECTION Use protective eyewear.		OTHER PROTECTIVE CLOTHING OR EQUIPMENT Long sleeves, long pants and closed toed shoes	
WORK/HYGENIC PRACTICES Wash hands and clothing after handling product				

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MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT / COMPANY IDENTIFICATION	HMSI HAZARD RATING
---	---------------------------

IDENTITY <div style="font-size: 1.2em; font-weight: bold; margin-left: 20px;">8-2-4</div>	HEALTH FLAMMABILITY REACTIVITY	2 2 1	0= INSIGNIFICANT 1=SLIGHT 3=HIGH 2=MODERATE 4=EXTREME
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MANUFACTURER'S NAME Live Earth Products, Inc. 400 S, 200 East Emery, Utah 85422	EMERGENCY: 1-800-846-2817 INFORMATION: (435)286-2222	DISTRIBUTOR'S NAME	INFORMATION:	DATE PREPARED: 6 March 2007 SUPERSEDES:
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SECTION 2-HAZARDOUS INGREDIENTS / IDENTITY INFORMATION

INGREDIENTS
 Humates (Leonardite), ammonium sulfate, mono-ammonium nitrate, mono-ammonium phosphate, potassium sulfate, magnetite and Soft rock phosphate.
 Activity: 8-2-4 3.5% Sulfur, 4.0 % Iron, 1.8% Calcium 16.0 % humates

SECTION 3- PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT NA	SPECIFIC GRAVITY NA	VAPOR DENSITY(Air = 1) N/A	SOLUBILITY IN WATER Partial
VAPOR PRESSURE (MM Hg.) NA	MELTING POINT >3000 degrees F.	EVAPORATION RATE (Butyl Acetate = 1) N/A	

APPEARANCE AND ODOR
 Dark brown, grey, white crystalline, yellow crystalline, dry granular / Odor: Earthy mineral odor.

SECTION 4 - FIRE AND EXPLOSIVE HAZARD DATA

FLASH POINT N/A	METHOD N/A	FLAMMABLE LIMITS N/A	LEL N/A	UEL N/A	EXTINGUISHING MEDIA N/A
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A			SPECIAL FIRE FIGHTING PROCEDURES N/A		

SECTION 5 - REACTIVITY DATA

STABILITY STABLE	CONDITIONS TO AVOID N/A	HAZARDOUS DECOMPOSITION OR BYPRODUCTS N/A
HAZARDOUS POLYMERIZATION WILL NOT OCCUR	CONDITIONS TO AVOID N/A	INCOMPATIBLY N/A

SECTION 6 - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY - SIGNS AND SYMPTOMS OF EXPOSURE INHALATION: NO EYES: YES SKIN: YES INGESTION: YES	EMERGENCY AND FIRST AID PROCEDURES N/A Immediately flush with with water for at least 15 minutes. Call Physician if symptoms persisl. Wash contaminated areas with plenty of water. Remove contaminated clothing and wash before reuse. If skin irritation continues consult a physician. If swallowed do not induce vomiting. Give one or two glasses of milk or water. Contact a physician immediately.		
CARCINOGENICITY N/A	NTP N/A	IARC N/A	OSHA REGULATED N/A

MEDICAL CONDITIONS-GENERALLY AGGRAVATED BY EXPOSURE:

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
 Spills should be picked up and reutilized if uncontaminated. Collect and dispose of any contaminants in accordance with all Local, State and Federal regulations.

WASTE DISPOSAL METHOD
 Spills should be reused if possible and disposed of in a proper facility in accordance with all local and federal guidelines.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
 Use proper protective equipment when applying. Handle materials with care.

OTHER PRECAUTIONS
 N/A

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION Use NIOSG/MSHA approved equipment if used in closed areas or areas where dust is likely.				
VENTILATION Use in open areas.	LOCAL EXHAUST N/A	OTHER N/A	SPECIAL N/A	MECHANICAL (GENERAL) Usually adequate
PROTECTIVE GLOVES YES	EYE PROTECTION Use protective eyewear.	OTHER PROTECTIVE CLOTHING OR EQUIPMENT Long sleeves, long pants and closed toed shoes		
WORK/HYGENIC PRACTICES Wash hands and clothing after handling product				

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MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT / COMPANY IDENTIFICATION **HMSI HAZARD RATING**

ENTITY Emerald Green	HEALTH 2	FLAMMABILITY 0	REACTIVITY 1	0= INSIGNIFICANT 1=SLIGHT 3=HIGH 2=MODERATE 4=EXTREME
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MANUFACTURER'S NAME Live Earth Products, Inc. 400 S, 200 East Emery, Utah 85422	EMERGENCY: 1-800-846-2817 INFORMATION: (435)286-2222	DISTRIBUTOR'S NAME	INFORMATION:	DATE PREPARED: 6 March 2007 SUPERSEDES:
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SECTION 2-HAZARDOUS INGREDIENTS / IDENTITY INFORMATION

INGREDIENTS
 Urea, mono-ammonium phosphate, ammonium sulfate, potassium nitrate, iron chloride, manganese, zinc and copper sulfates.
 Activity: 8.0%N, 4.0% P, 8.0% K pH 6.4

SECTION 3- PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT 126 degrees C	SPECIFIC GRAVITY 1.19 g/cm3	VAPOR DENSITY(Air = 1) N/A	SOLUBILITY IN WATER Good
VAPOR PRESSURE (MM Hg.) 10 m-bar	MELTING POINT minus 21 degrees C	EVAPORATION RATE (Butyl Acetate = 1) N/A	

APPEARANCE AND ODOR
 Emerald Green Liquid/Odor: Light metallic odor

SECTION 4 - FIRE AND EXPLOSIVE HAZARD DATA

FLASH POINT N/A	METHOD N/A	FLAMMABLE LIMITS N/A	LEL N/A	UEL N/A	EXTINGUISHING MEDIA N/A
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A			SPECIAL FIRE FIGHTING PROCEDURES N/A		

SECTION 5 - REACTIVITY DATA

STABILITY	STABLE	CONDITIONS TO AVOID N/A	HAZARDOUS DECOMPOSITION OR BYPRODUCTS N/A
HAZARDOUS POLYMERIZATION	WILL NOT OCCUR	CONDITIONS TO AVOID N/A	INCOMPATIBLY N/A

SECTION 6 - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY - SIGNS AND SYMPTOMS OF EXPOSURE	EMERGENCY AND FIRST AID PROCEDURES			
INHALATION: NO	N/A			
EYES: YES	Immediately flush with water for at least 15 minutes.			
SKIN: YES	Call Physician if symptoms persist.			
INGESTION: YES	Wash contaminated areas with plenty of water. Remove contaminated clothing and wash before reuse. If skin irritation continues consult a physician.			
INGESTION: YES	If swallowed do not induce vomiting. Give one or two glasses of milk or water. Contact a physician immediately.			
CARCINOGENICITY	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"> NTP N/A </td> <td style="width: 25%;"> IARC N/A </td> <td style="width: 50%;"> OSHA REGULATED N/A </td> </tr> </table>	NTP N/A	IARC N/A	OSHA REGULATED N/A
NTP N/A	IARC N/A	OSHA REGULATED N/A		
MEDICAL CONDITIONS-GENERALLY AGGRAVATED BY EXPOSURE:				

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
 Use an absorbant material to collect spill. Collect and dispose of in accordance with all Local, State and Federal regulations.

WASTE DISPOSAL METHOD
 Triple rinse and puncture containers after use.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
 Shake well before use. Do not attempt to reuse container

OTHER PRECAUTIONS
 Keep material in a temperate environment. Do not expose to direct sunlight. Exposure can cause swelling of container and possible breakage.

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION NIOSG/MSHA approved for mists. Employ respiratory protection when exposure to mist and spray is possible				
VENTILATION Use in open areas.	LOCAL EXHAUST N/A	OTHER N/A	SPECIAL N/A	MECHANICAL (GENERAL) Usually adequate
PROTECTIVE GLOVES YES	EYE PROTECTION Use protective eyewear.	OTHER PROTECTIVE CLOTHING OR EQUIPMENT Long sleeves, long pants and closed toed shoes		
WORK/HYGENIC PRACTICES Wash hands and clothing after handling product				

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Live Earth Products Inc., Soil Conditioner

Safety Data Sheet

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/Injuries: Causes eye irritation.

Symptoms/Injuries After Inhalation: Dust from this product may cause irritation to the respiratory tract.

Symptoms/Injuries After Skin Contact: Contact during a long period may cause slight irritation.

Symptoms/Injuries After Eye Contact: Causes eye irritation. Contact may cause irritation due to mechanical abrasion.

Symptoms/Injuries After Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: Inhalation of dust may have adverse effects.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

Immediate medical attention is not required. If exposed or concerned, get medical advice and attention.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for fire. No special media required.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not considered flammable.

Explosion Hazard: Contains substances that are combustible dusts. Fine dust of the product is capable of dust explosion.

Reactivity: Hazardous reactions will not occur under normal conditions.

5.3. Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Fight fire with normal precautions. Use firefighting measures appropriate for the fire.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Handle in accordance with good industrial hygiene and safety practice.

Protective Equipment: Use appropriate personal protection equipment (PPE).

6.1.1. For Emergency Responders

Protective Equipment: Equip cleanup crew with proper protection. Respiratory equipment is not normally needed.

6.2. Environmental Precautions: None

6.3. Methods and Material for Containment and Cleaning Up

Methods for Cleaning Up: Collect spillage and store to re-use.

Reference to Other Sections

See Heading 8. Exposure controls and personal protection. See Section 13, Disposal Considerations.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Precautions for Safe Handling: Fine dust of the product is capable of dust explosion. If dust is generated: avoid all sources of ignition: heat, sparks, and open flame.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations.

Storage Conditions: Keep Store in a dry, cool place.

Incompatible Products: None.

7.3. Specific End Use(s)

Soil amendment.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), or OSHA (PEL).

Live Earth Products Inc., Soil Conditioner

Safety Data Sheet

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information On Toxicological Effects

Acute Toxicity: Not classified

Ashes, residues (68131-74-8)	
LD50 Oral Rat	> 6000 mg/kg

Skin Corrosion/Irritation: Not classified.

pH: 3

Serious Eye Damage/Irritation: Causes eye irritation.

pH: 3

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: Not classified

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Dust from this product may cause irritation to the respiratory tract.

Symptoms/Injuries After Skin Contact: Contact during a long period may cause slight irritation.

Symptoms/Injuries After Eye Contact: Causes eye irritation. Contact may cause irritation due to mechanical abrasion.

Symptoms/Injuries After Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: Inhalation of dust may have adverse effects.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - General : Not classified.

12.2. Persistence and Degradability

Soil Conditioner	
Persistence and Degradability	Not established.

12.3. Bioaccumulative Potential

Soil Conditioner	
Bioaccumulative Potential	Not established.

12.4. Mobility in Soil No additional information available

12.5. Other Adverse Effects No additional information available

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste Disposal Recommendations: No special precautions are needed for this mined mineral. Dispose of contents/container in accordance with local, regional, national, and international regulations.

SECTION 14: TRANSPORT INFORMATION

14.1. In Accordance with DOT Not regulated for transport

14.2. In Accordance with IMDG Not regulated for transport

14.3. In Accordance with IATA Not regulated for transport

SECTION 15: REGULATORY INFORMATION

15.1 US Federal Regulations

Soil Conditioner	
SARA Title III Hazard Classification (Yes/No)	Immediate (acute) Health : N
	Delayed (Chronic) Health: N
Sudden Release of	Pressure:
	Fire: N
	Reactive: N

15.2 US State Regulations

No data available.

National Fire Protection Association Rating: Health: 1 Fire: 0 Reactivity: 0
Rating level : (4-Extreme, 3-High, 2-Moderate, 1-Slight, 0-Minimum)

MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT / COMPANY IDENTIFICATION HMIS HAZARD RATING

ENTITY Bio-Basics	HEALTH 1	FLAMMABILITY 0	REACTIVITY 0	0= INSIGNIFICANT 1=SLIGHT 2=MODERATE 3=HIGH 4=EXTREME
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MANUFACTURER'S NAME Live Earth Products, Inc. 400 S. 200 East Emery, Utah 85422	EMERGENCY: 1-800-846-2817 INFORMATION: (435)286-2222	DISTRIBUTOR'S NAME INFORMATION:	DATE PREPARED: 6 March 2007 SUPERSEDES:
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SECTION 2-HAZARDOUS INGREDIENTS / IDENTITY INFORMATION

INGREDIENTS
 Humates (Leonardite), Humic shale ore and soft rock phosphate
 Activity: (1-7-0), 1.7% Iron, 2% Sulfur, 7% Calcium 27.0% Humates

SECTION 3- PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT NA	SPECIFIC GRAVITY NA	VAPOR DENSITY(Air = 1) N/A	SOLUBILITY IN WATER Partial
VAPOR PRESSURE (MM Hg.) NA	MELTING POINT >3000 degrees F.	EVAPORATION RATE (Butyl Acetate = 1) N/A	

APPEARANCE AND ODOR
 Dark brown dry granular / Odor: Earthy mineral odor.

SECTION 4 - FIRE AND EXPLOSIVE HAZARD DATA

FLASH POINT N/A	METHOD N/A	FLAMMABLE LIMITS N/A	LEL N/A	UEL N/A	EXTINGUISHING MEDIA N/A
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A			SPECIAL FIRE FIGHTING PROCEDURES N/A		

SECTION 5 - REACTIVITY DATA

STABILITY STABLE		CONDITIONS TO AVOID N/A	HAZARDOUS DECOMPOSITION OR BYPRODUCTS N/A
HAZARDOUS POLYMERIZATION WILL NOT OCCUR		CONDITIONS TO AVOID N/A	INCOMPATIBLY N/A

SECTION 6 - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY - SIGNS AND SYMPTOMS OF EXPOSURE INHALATION: NO EYES: YES SKIN: YES INGESTION: YES CARCINOGENICITY N/A	EMERGENCY AND FIRST AID PROCEDURES N/A Immediately flush with water for at least 15 minutes. Call Physician if symptoms persist. Wash contaminated areas with plenty of water. Remove contaminated clothing and wash before reuse. If skin irritation continues consult a physician. If swallowed do not induce vomiting. Give one or two glasses of milk or water. Contact a physician immediately. IARC N/A
NTP N/A	OSHA REGULATED N/A

MEDICAL CONDITIONS-GENERALLY AGGRAVATED BY EXPOSURE:

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
 Spills should be picked up and reutilized if uncontaminated. Collect and dispose of any contaminants in accordance with all Local, State and Federal regulations.

WASTE DISPOSAL METHOD
 Spills should be reused if possible and disposed of in a proper facility in accordance with all local and federal guidelines.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
 Use proper protective equipment when applying. Handle materials with care.

OTHER PRECAUTIONS
 N/A

SECTION 8 - CONTROL MEASURES

RESPIRATORY PROTECTION
 Use NIOSH/MSHA approved equipment if used in closed areas or areas where dust is likely.

VENTILATION Use in open areas.	LOCAL EXHAUST N/A	OTHER N/A	SPECIAL N/A	MECHANICAL (GENERAL) Usually adequate
PROTECTIVE GLOVES YES	EYE PROTECTION Use protective eyewear.	OTHER PROTECTIVE CLOTHING OR EQUIPMENT Long sleeves, long pants and closed toed shoes		

WORK/HYGENIC PRACTICES
 Wash hands and clothing after handling product

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Exposure Standard: None established.

For Health Emergencies Call Your Local Poison Control Center

Section 6	Precautions for Safe Handling & Use
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If Material is Released or Spilled: Sweep up and scoop into container for reuse; recycle or disposal. Keep out of all waterways.

Disposal: Use or recycle. If product is contaminated, dispose of in an approved landfill disposal facility in accordance with applicable federal, state provincial or local regulations.

Precautions to be Taken in Handling and Storing: Store in dry area. Keep out of reach of children.

Section 7	Control Measures
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Respiratory Protection: NIOSH/MSHA approved respirator.

Ventilation: Local exhaust: Local exhaust or general ventilation.

Mechanical (general): To keep dust below OSHA nuisance—15 Mg/M3

Protective Gloves: None Required

Eye Protection: Protective Goggles

Other Protective Clothing or Equipment: None Required

Work/hygienic Practices: Normal hygienic practices.

Section 8	Additional Information
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**Notice from Tri-C Enterprises, LLC
Concerning This Material Safety Data Sheet**

The information contained herein is offered only as a guide to the handling of these specific materials. Since such information does not relate to use of the material with any other material or in any process, any person using this information must determine for himself its suitability for any particular application. The buyer and user assume all risk and liability of use, storage and/or handling of this product not in accordance with the terms of the product label.

**Contact:
General Manager
Telephone: 1-800-927-3311 / 1-909-590-1790**



Organic Soil Amendments for Healthy SOIL & ROOTS

FEATURES and BENEFITS

Soil Prep ** Backfill ** Maintenance ** Hydroseeding ** Erosion Control ** Hydroponics ** Drip Irrigation ** Foliar

FOR Super Healthy SOIL:

Tri-C Humate: 40 % Humic Acids* Soil Prep ** Backfill ** Hydroseeding ** Erosion Control

- 100 % Highly Concentrated Granular Organic Soil Conditioner
- Over 20 naturally occurring micronutrients
- Add NPK per Soil and Plant Needs
- Approved for "Certified" Organic Growers----OMRI LISTED & OIM (Calif)

Tri-C "Premium" Humate: 35 % Humic Acids* Soil Prep ** Backfill ** Maintenance ** Hydroseeding ** Erosion Control IMPROVE Poor Soil Conditions

- 100 % Highly Concentrated mini GRANULAR Natural Soil Conditioner
- Over 20 naturally occurring micronutrients
- Add NPK per Soil and Plant Needs
- **GREENS GRADE (looks like coffee grounds)**

Tri-C Humate Plus: 1.5 % Humic Acids* Soil Prep ** Backfill ** Maintenance

- GRANULAREasy to Apply
- 7 % Calcium and 5 % Sulfur too! / Helps Lower pH and Sodium
- Concentrated Natural Soil Conditioner w/GYPSUM
- ENHANCES Other Soil Amendments
- IMPROVES Poor Soil Conditions

Tri-C 6-2-4 + 5 % S: 20 % Humic Acids * Soil Prep ** Backfill ** Maintenance ** Hydroseeding ** Erosion Control

- 2 Products...1 Application SOIL CONDITIONER & FERTILIZER
- GRANULAR
- Highly Concentrated Natural Conditioner IMPROVES Poor Soil
- Cost 50-60 % Less than Competitor (more than TWICE the coverage)

Tri-C SOLUBLE Humate Powder : 35 % Humic Acids* Maintenance ** Hydroseeding ** Erosion Control

- ** Hydroponics ** Drip Irrigation ** Foliar
- * SOIL CONDITIONER Powder for ALL LIQUID APPLICATIONS
- * 100% Natural ...100% Soluble
- * Highly Concentrated Conditioner IMPROVES Poor Soil
- * ENHANCES Other Soil Amendments / Works in most STANDARD FERTIGATION SYSTEMS!

NOTE: Humic Acids levels based on CDFA method which tests at approximately 30-40% lower than all other Lab test methods.

FOR Bigger Better ROOTS: MYCORRHIZAL INOCULUM

Tri-C Endo 120 (ARBUSCULAR MYCORRHIZAL INOCULUM): Soil Prep ** Backfill ** Hydroseeding ** Erosion Control

- Beneficial Mycorrhizae for trees, shrubs, and turf
- Increases water and nutrient holding capacity in the soil
- Naturally increases root mass

Tri-C Myco Paks (4 Endo-7 Ecto SPECIES) fungi in a teabag!

- Beneficial Mycorrhizae for trees and shrubs, including OAKS, New Planting and Maintenance
- Increases water and nutrient holding capacity in the soil
- Naturally increases root mass

Tri-C Myco TABS (17 Endo-Ecto MYCORRHIZAE and 17-9-5 NPK) **

- Beneficial Mycorrhizae for trees and shrubs, including OAKS, New Planting and Maintenance
- Increases water and nutrient holding capacity in the soil
- Naturally increases root mass

Tri-C Myco DRENCH (13 species Endo-Ecto MYCORRHIZAL INOCULUM) ** Maintenance ** Drip Irrigation

- **Micronized**...can be applied TOPICALLY on EXISTING Plant Material
- Beneficial Mycorrhizae for trees, shrubs, and turf, including OAKS
- Increases water and nutrient holding capacity in the soil
- Naturally increases root mass

Tri-C MYCO REVIVAL PLUS (8 Endo-Ecto MYCORRHIZAE and Tri-C Humate) New Planting and Maintenance

- **Micronized**...can be applied TOPICALLY on EXISTING Plant Material....

ALL the BENEFITS of Mycorrhizae and Humate in one Product Application **AMAZING RESULTS!!**

File:tricfeaben2016

TRI-C.....a Natural Sustainable SOILution!™

TRI-C @ 1-800-927-3311 www.naturalsoilutions.com or Email: info@tri-corganics.com

UDBE /DBE / WBE/ SB/EDWOSB/WOSB Certified Company Made in the USA



TRI-C ORGANICS
Products for a Natural Sustainable SOLUTION™

ORGANIC.... NATURAL.... SUSTAINABLE

DEFINITIONS:

Organic: Relating to or derived from living organisms, e.g. plants or animals.

Natural: As formed by nature without human intervention.

Sustainable Landscaping: Encompasses a variety of practices developed in response to environmental issues. Practices used in every phase of landscaping: design, construction, implementation and management of residential and commercial landscapes. (Sustainable landscaping – Wikipedia) May include: Bioswales; irrigation practice; plant & tree selection and site location; permeable paving materials; Recycled materials; Soil management enhancing healthy soil; renewable energy;

ARTICLES available via email request to Marilyn@tri-corganics:

Mycorrhizae 101

Microbial Nematode Control

Remediation of Fire Induced Hydrophobicity

Humates in Sodium Rich Soil

Nitrogen vs. Carbon

A Bibliography of Humates

Tri-C Enterprises, LLC

P.O. Box 1367, Chino, CA 91708-1367 USA

1-800-927-3311 fax: 909-590-3301 email: marilyn@Tri-Corganics.com www.naturalsoilsolutions.com

SBE /DBE/UDBE/WBE/EDWOSB/WOSB Certification



Activator Ca

0-5.5-0

*For use on all Turf and Ornamentals
Promotes plant growth.*

- Apply 10-20 pounds per 1000 square feet.
- For pre-plant soil preparation use 20 to 150 pounds per 1000 square feet.
- Apply quarterly or as needed.
- For planting mixes use 6-8 pounds per cubic yard.

Net weight 50 lbs. (22.68 kg.)
Use only as directed.



Warranty:

JTM Nutrients warrants that this product consists of the ingredients specified and is reasonably fit for the purpose stated on the label when used in accordance with directions under normal conditions of use. Because the time, place, rate of application and other conditions are beyond the seller's control, seller's liability from handling, storage and use of this product is limited to replacement of product or refund of purchase price. Keep out of the reach of children. Avoid contact with eyes, skin and clothing. In case of contact immediately flush with plenty of water for 15 minutes. Information regarding the contents and levels of metals in this product is available on the internet at: <http://www.aapfco.org/metals.htm>.

Made in the U.S.A.

Guaranteed Analysis:

Available Phosphate (P2O5) 5.50%
Calcium (Ca).....7.00%
Iron (Fe).....1.00%

Derived from:
Magnetic rock and
rock phosphate.

ALSO CONTAINS NON-PLANT
FOOD INGREDIENT(S):
10.00% Humic Acid derived
from humic shale ore.

JTM Nutrients L.L.C.
1509 N. Kraemer Blvd., Suite H
Anaheim, California 92806
phone (949) 632-7378

jtmnutrients.com



Lot#

City of Irvine

Specification
Infield Maintenance

Baseball/Softball Infield Maintenance Task	Labor time	Frequency
Patch/tamp batters box & pitch mound	10 min.	Daily
Raking infield skin to turf transition	5 min.	Daily
Raking debris	5 min.	Daily
Clean out base pegs	5 min.	Daily
Stiff drag infield & warning track	15 min.	Daily
Sweep home plate & pitching rubber	1 min.	Daily
Water down infield	15 min.	Daily
Remove weeds	5 min.	As needed
Nail dragging/scarification skin infield	20 min.	As needed
Paint foul lines	5 min.	As needed
Edge infield apron & warning turf track	30 min.	As needed
Water blasting apron edges	30 min.	As needed
Add calcine clay conditioner	15 min.	As needed
Install/remove pitching rubber & bases	30 min.	As needed

Specification Infield Maintenance

Field preparation requirements are completed as necessary to meet the scheduled games and practices of the user groups. Daily field preparation can vary depending on the number of events assigned to a field per week.

Patching and tamping batters boxes and pitching mounds:

1. Sweep/remove loose material from hole
2. Lightly water area to be repaired and let soak in
3. Scratch area with steel rake or landscape rake to create bonding surface for existing or new material being used for repair.
4. Fill hole with new infield clay or hill topper and again lightly water and let in soak in.
5. When material is firm enough tamp until compacted.
6. The finished product should be level with the surrounding area.
7. Mounds should be kept to specification given by City Representative. To retain the quality, shape, and playability of pitching mounds use a mound slope gauge. The area repaired should not be soft or move under pressure of foot and area needs to be hand watered with a hose.

Raking infield skin to turf transition:

Using a leaf rake, rake the skin to turf transition at a 45 degree angle from the turf onto the infield skin pulling any loose infield mix or debris from the turf edge onto skin. This can be done for any transition zone.

Raking debris:

Using a leaf rake, rake debris such as leaves, grass clipping, sunflower seeds and trash from skin areas including bullpens, warning tracks, infields and foul territory and remove.

Remove weeds:

Remove weeds from skin areas including bullpens, warning tracks, infields and foul territory mechanically. No pesticides shall be applied on the infields.

Cleanout base pegs and insert plugs:

Using a base peg cleanout tool, clean dirt from inside base pegs and insert plugs. Expose base pegs for use each day as listed on Community Services base distance sheet.

Nail dragging/scarification of infield skin/warning track:

Moisture content is paramount to successful nail dragging/scarification. The skin must not be too wet or too dry. If too wet the mix will clump and stick to the implement. If too dry, the implement will not break up the top $\frac{1}{4}$ " to $\frac{1}{2}$ " of the mix. When the moisture is correct, nail drag/scarify the infield skin daily in a circular pattern, keeping a distance of at least twelve inches from fencing and concrete and six inches from turf, loosening the top $\frac{1}{4}$ " to $\frac{1}{2}$ ". Scarification is once a month to prevent compaction. Note: Dragging and scarification are two separate items.

Stiff drag infield skin/warning track:

Pre-watering are required to prevent dust to a minimum before dragging the infield prior using a stiff drag, drag the infield skin in a circular pattern keeping a distance of at least twelve inches from fencing and concrete and six inches from turf, leveling and smoothing the surface. Begin dragging and end dragging at different spots of the field daily to avoid creating low or high spots. Do not drag across turf edges for any reason, as this will create a bump and lip in the skin to turf transition. Avoid dragging over mounds, home plate, and pitching rubbers. Stiff dragging is to be done at a low speed to prevent damages to home plate or pitching rubbers.

Sweep home plate and pitching rubber:

Using a broom, sweep away any debris that covers the home plate and pitching rubber so as they are clearly visible to city staff, players and umpires.

Water down infield skin:

Water is extremely important for safety and playability. Utilizing quick couplers, hoses and sprinklers, water down the infield skin creating an even dispersal of water over the entire area. Depending on the time of year, length of day, amount of sunlight and temperature, more or less water will need to be applied to get the desired playability and condition. It is not uncommon to water an infield multiple times throughout the day to maintain the proper moisture. Hand water infield turf, mounds, batter box and base area's to maintain quality of infield skin per City Representative.

Paint foul lines, arc lines and out of play:

Paint foul line, arc lines and out of play lines as requested by the City Representative. Use of string and bases when painting foul lines to baseball/softball specification. The contractor will provide paint.

Edge infield apron and warning track turf:

As needed, using mechanical edger, edge infield and warning track turf to specifications per City Representative. Infield and warning track size should not grow or shrink throughout the year. Use a hula hoe only when necessary. Clean up clippings and debris from area worked and adds fresh infield mix if needed to fill low spots.

Water blasting apron edges:

Wash out loose material along apron edge to prevent material build up along apron edge. With a lute tool or leaf blower, pull material from infield to grass edge and make apron leveled. It should be done bi-weekly upon

City Representative. A smooth, firm transition from skin to turf should be the final product.

Add calcine clay conditioner:

Per the City Representative, use a walk behind rotary spreader to spread calcined clay conditioner onto the skinned infield surface in an even pattern being careful not to throw any material onto turf or hardscape.

Install/remove pitching rubbers, home plates and base pegs:

Install/remove pitching rubber, home plate and base pegs as directed by the City Representative. Each piece is to be installed to the specifications provided by the City Representative to assure proper distances and field requirements are being preserved.

City of Irvine

Parks & Athletic Fields

Pesticides

Pesticides

All pesticides used shall follow the Public Works Integrated Pest Management Policy (IPM) on the following page. All pesticide application shall be approved by the City Landscape Maintenance Superintendent prior to use. A licensed California Pest Control Advisor shall prepare, and submit to the City Representative, a written recommendation of proposed pesticides, including commercial name, concentrations, application rates, and usage and reentry time and site-specific schedule. No work shall begin until written approval of use is obtained and a notice of intent has been filed with the County Agricultural Commissioner's office as required. Copies of Safety Data Sheets and specimen labels shall be given to the City Representative prior to pesticide use on City property and rights-of-way. Organic pesticide shall be the first choice to control a pest.

Records of all pesticides and fertilizers used by the contractor on City property will be submitted by the fifth working day of the month to the City Representative. The contractor is responsible to maintain site and date specific records of all pesticides and fertilizer application. The records shall be retained in accordance with Department of Pesticide Regulations.

Posting of signs shall be required at all park facilities. The same signs must be left up to 72 hours after spraying applications are completed, then the signs must be removed promptly.

Integrated Pest Management: The City initiated a strict Integrated Pest Management Policy on February 23, 2016, with the focus on long term prevention or suppression of pest problems with minimum impact on human health, the environment, and non-target organisms. The City employs professional pest control servicers licensed through the State of California Department of Pesticide Regulation. With the new integrated pest management (IPM) program in mind



Public Works Department Maintenance Operations Policies and Procedures

INTEGRATED PEST MANAGEMENT PROGRAM

PURPOSE: To establish criteria for an Integrated Pest Management (IPM) Program.

POLICY: The City of Irvine will focus on long-term prevention or suppression of pest problems with minimum impact on human health, the environment, and nontarget organisms with the limited use of pesticides in accordance with direction provided by the City Council for Parks, Fields and Playgrounds; and City-wide Pest Management Guiding Principles:

City-wide Pest Management Guiding Principles

- a. Use of organic pesticides in all City properties.
- b. Limit exposure to any pesticides where children and the general public congregate.
- c. Incorporate additional guidance on use of pesticides for city rights of way, facilities, and other properties as reflected in the staff report.
- d. Use EPA Level pesticides in a targeted manner, and only if deemed necessary to protect public health and economic loss by a licensed pest control adviser and City staff, when pests cannot be managed by other methods that we would have.

PROCEDURES:

Prevention

1. Public Works Staff shall review all new development and rehabilitation projects plans to verify compatibility with the site's environment.

Monitoring

1. The Maintenance Divisions shall hire a consultant or contractor to provide regular monitoring services for all of the City's properties.



2. The consultant or contractor shall determine if pest populations are increasing, decreasing, or staying the same and to determine when to use a control tactic.
3. The consultant or contractor shall provide monthly monitoring records which include information such as date of examination, pests found, size and extent of the infestation, location of the infestation, control options utilized, effectiveness of the control options, labor and material costs.

Non Chemical Control Measures

1. The Landscape Division shall utilize cultural controls which are modifications of normal plant care activities that reduce or prevent pests. In addition to those methods used in the pest preventions, other cultural control methods include adjusting the frequency and amount of irrigation, fertilization, and mowing height.
2. The Maintenance Divisions shall utilize mechanical control tactics involve the use of manual labor and machinery to reduce or eliminate pest problems using methods such as handpicking, physical barriers, or machinery to reduce pest abundance indirectly.
3. The Maintenance Divisions shall utilize the use of environmental manipulations that indirectly control or prevent pests by altering temperature, light, and humidity can be effective in controlling pests. Although in outdoor situations these tactics are difficult to use for most pests, they can be effective in controlling birds and mammals if their habitat can be modified such that they do not choose to live or roost in the area.
4. The Maintenance Divisions shall utilize a biological control practice which uses living organisms to reduce pest populations. These organisms are often also referred to as beneficials, natural enemies or biocontrols. They act to keep pest populations low enough to prevent significant economic damage. Biocontrols include pathogens, parasites, predators, competitive species, and antagonistic organisms. Beneficial organisms can occur naturally or can be purchased and released. The most common organisms used for biological control in landscapes are predators, parasites, pathogens and herbivores.



Pesticide Controls

Pesticides are to be utilized in a prioritized approach on City properties as follows:

Parks, Fields and Playgrounds:

When pesticides are needed, use the following prioritized approach: (1) organic pesticides; (2) Water Quality Act Allowed Pesticides; and (3) EPA Level III "caution" labeled pesticides only when deemed necessary to protect public health and economic impact by a licensed pest control adviser.

Rights of Way (Street medians/parkways) – Prioritized Use of Pesticides:

- a. Use organic pesticides first, when pesticides are needed.
- b. Use Clean Water Act allowed pesticides.
- c. EPA Level III "caution" label pesticide only if deemed necessary to protect public health and economic impact by a licensed pest control adviser and City staff.
- d. EPA Level II "warning" label pesticides, only if deemed necessary to protect public health and economic loss by a licensed pest control adviser and City staff, when other methods do not adequately control the pest.
- e. EPA Level I "danger" label pesticides, only if deemed necessary to protect public health and economic loss by a licensed pest control adviser and City staff, when other methods do not adequately control the pest.

Facilities/Buildings – Prioritized Use of Pesticides:

- a. Use organic pesticides first, when pesticides are needed.
- b. Use Clean Water Act allowed pesticides.
- c. Bait formulations of insecticides will be used where appropriate.
- d. EPA Level III "caution" label pesticide only if deemed necessary to protect public health and economic impact by a licensed pest control adviser and City staff.
- e. EPA Level II "warning" label pesticides, only if deemed necessary to protect public health and economic loss by a licensed pest control advisor and City staff, when other methods do not adequately control the pest.



- f. EPA Level I "danger" label pesticides, only if deemed necessary to protect public health and economic loss by a licensed pest control adviser and City staff, when other methods do not adequately control the pest.

Other City Properties – Prioritized Use of Pesticides:

- a. Use organic pesticides first, when pesticides are needed.
- b. Use Clean Water Act allowed pesticides
- c. EPA Level III "caution" label pesticide only if deemed necessary to protect public health and economic impact by a licensed pest control adviser and City staff.
- d. EPA Level II "warning" label pesticides, only if deemed necessary to protect public health and economic loss by a licensed pest control adviser and City staff, when other methods do not adequately control the pest.
- e. EPA Level I "danger" label pesticides, only if deemed necessary to protect public health and economic loss by a licensed pest control adviser and City staff, when other methods do not adequately control the pest. Pesticides should only be used when other methods fail to provide adequate control of pests and just before pest populations cause an unacceptable damage, since the overuse of pesticides can cause beneficial organisms to be killed and pest resistance to develop.

Approvals and Application of Chemical Pesticides

1. Pesticides shall be approved by the Maintenance Division Superintendents for their area of oversight prior to use. A written recommendation of proposed pesticide, including commercial name, concentrations, allocation rates, usage and reentry time shall be prepared by a licensed California Pest Control Adviser and site specific schedule submitted for approval. No work shall begin until written approval of use is obtained and a notice of intent has been filed with the County Agricultural Commissioner's office, as required. Copies of Safety Data Sheets and specimen labels shall be given to the City prior to pesticide use on City property.
2. For Facilities and Building Maintenance, the referenced responsibilities of a licensed pest control adviser presented throughout this policy are to be performed by a California State Licensed Structural Pest Control Operator.
3. Chemicals shall only be applied by those persons possessing a valid California Qualified Applicator license/certificate; or a Structural Pest



Control License. Application shall be in strict accordance with all governing regulations. Records of all operations shall be kept per California Department of Pesticide Regulations, or the California Structural Pest Control Board.

4. Pesticides shall be applied in a manner to avoid contamination of non-target areas. Precautionary measures shall be employed to keep the public from entering the spray zone until it is safe.
5. Posting of signs shall be required at all park facilities when any application of pesticides is performed.

Specific requirements for posting are as follows:

- Post signs at all park entrances at least 48 hours prior to spraying applications. The vendor's contact information, chemical name and application date must be listed.
- Place spray notices inside plastic page protectors. Attach them to a four-foot (4') high wooden stake. Signs must be readable 25' away from posted area.
- Leave the same signs up for 72 hours after the spraying applications are completed, then remove promptly.
- A temporary mesh fence such as orange plastic construction fencing can be erected on the perimeter of any area that is to be treated with a broadcast type application with the intent to keep people and pets off the treated area for a period of 24 hours.

Records and Reporting

Records of all pesticides used by the Contractor on City property shall be retained in accordance with Department of Pesticide Regulations. Maintenance Superintendents will keep records of all pesticide usage and the Public Works Department will provide an annual report to the City Council.



Manuel Gomez, Director of Public Works

Approved: March 2, 2016

EcoEXEMPT® IC²

Insecticide Concentrate

with **EcoSMART BOTANICALS™**, a blend of plant oils, tested and proven to kill and control a broad spectrum of insects.

ACTIVE INGREDIENT:	Rosemary Oil.....	10.0%
	Peppermint Oil.....	2.0%
OTHER INGREDIENTS:	Oil of Wintergreen, Mineral Oil USP, Vanillin.....	88.0%
TOTAL.....		100.0%

- New, softer fragrance
- Provides rapid knockdown/kill and residual protection.
- Multi-purpose: For indoor, outdoor, fogging, turf and ornamental, on-animal and mosquito misting applications.
- Safe for use in and around sensitive accounts.
- Minimum risk pesticide.
- Safe around children and pets.

CAUTION

FIRST AID

IN EYES: Flush with plenty of water. Seek medical attention if irritation persists.
IF ON SKIN: Wash with soap and water.
IF INHALED: Remove exposed person(s) to fresh air.
IF SWALLOWED: Rinse mouth out with water. Do not induce vomiting. Seek medical attention if feeling sick or nauseous.

PRECAUTIONARY STATEMENTS

May cause eye and skin irritation. Avoid contact with eyes, skin and clothing.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Persons handling concentrate are recommended to wear:

- Protective eyewear
- Chemical resistant gloves made of neoprene, nitrile or natural rubber.

User Safety Recommendations

User should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove clothing immediately if the product gets on the skin. Wash thoroughly and put on clean clothing. Remove PPE after handling this product. Wash the outside of the gloves before removing.

PHYSICAL AND CHEMICAL HAZARDS

Do not use, pour spill or store near heat or open flame. Store only in original container.

DIRECTIONS FOR USE

FOR BEST RESULTS AND TO IMPROVE COMPATIBILITY – MIX WITH AN ADJUVANT SUCH AS EcoADJUVANT. OTHER ADJUVANTS THAT CAN BE USED, (BUT NOT LIMITED TO) INCLUDE:

Thoroughbred, NO Foam A, Latron AG-44M, Latron AG-98, Prospreader Activator, Activator 90, Latron CS-7, EZ Mix, Penetrator +(plus), Freeway, Hyperactive, Induce, X-77, or Widespread

MIX ADJUVANT WITH EcoEXEMPT® IC² FIRST. Follow use directions on the individual labels. Use amount of adjuvant proportionate to the amount of EcoEXEMPT® IC² used (i.e. if using EcoEXEMPT® IC² at the higher rates, use the adjuvant at proportionately higher rates).

When using this product as a space spray in food processing plants, foods should be removed or covered during treatment. Do not apply as a space spray while food processing is underway. Food processing surfaces and equipment must be covered during treatment or cleaned with an effective detergent and rinsed, with potable water before reuse. Food processing operations may continue when this product is applied as a surface spray with care and in accordance with the directions and precautions given below.

SHAKE WELL BEFORE USING. Maintain agitation in all spray systems. EcoEXEMPT® IC² is intended for use in and around buildings and structures as well as modes of transport.

INDOOR USE AREAS: Includes, but is not limited to, apartment buildings, bakeries, beverage plants, bottling facilities, breweries, cafeterias, candy plants, canneries, cereal processing and manufacturing plants, dairy barns, poultry facilities, flour mills, food processing plants, frozen food plants, homes, hospitals, hotels, houses, industrial buildings, kennels, kitchens, laboratories, manufacturing facilities, mausoleums, meat processing and packaging plants, meat and vegetable canneries, motels, nursing homes, office buildings, restaurants, schools, stores, supermarkets, warehouses and similar structures.

OUTDOOR AREAS: Includes, but is not limited to, building foundations, utility facilities, drive-in restaurants, drive-in theaters, golf courses, parks, playgrounds, poultry houses, recreational areas, schools, urban areas, lawns, landscape areas, trees, turf and zoos.

MODES OF TRANSPORT: Aircraft, buses, trucks, trailers, rail cars and marine vessels.

NOTE: For sensitive indoor/outdoor surfaces such as vinyl, plastic, fabric, wood floors, etc. test a small non-visible area first before spraying.

This includes vinyl siding, outdoor furniture, storm doors and windows, etc. It is possible that EcoEXEMPT® IC² may mar some sensitive surfaces. If spray gets on any sensitive surface that is listed, simply rinse with water and wipe off with clean cloth.

EcoEXEMPT® IC² may be diluted with water or oil and applied with conventional application equipment including, but not limited to, compressed air sprayers and power sprayers. When diluting with water, prepare only the amount needed for immediate use and maintain agitation during use. Do Not Store Spray Solution Overnight! For oil dilutions that are applied in food handling establishments, a deodorized petroleum oil which conforms to CFR 21 (especially section 172.884) is required (such as Exxon Isopar M, Ashland Low Odor Base Solvent or the equivalents).

Tank mix applications must be made in accordance with the more restrictive of label limitations and precautions. No label dosages may be exceeded. This product cannot be tank mixed with any product with label prohibitions against such mixing.

INDOOR USE

Do not apply directly to house plants. Cover/avoid any pools or aquaria prior to spraying.

GENERAL PEST CONTROL: To control accessible, exposed stages of crawling insects including, but not limited to, Ants, Bed Bugs, Cockroaches, Caddisflies, Cigarette Beetles, Dark Mealworms, Dried Fruit Beetles, Drugstore Beetles, Confused Floor Beetles, Fleas, Grain Mites, Fowl mites, Mites, Nuisance Beetles (such as Lady Beetles), Red Flour Beetles, Rice Weevils, Saw-toothed Grain Beetles, Spiders, Spider Beetles, Termites, Yellow Mealworms in sites that include, but are not limited to, apartments, homes, restaurants, food processing plants, industrial installations and warehouses, dilute at the rate of up to .5 to 6 fluid ounces of EcoEXEMPT® IC² per gallon of water (use lower rate for maintenance service and higher rates for active infestations). Thoroughly spray non-visible areas where these insects are usually found with special attention to cracks and crevices, niches, dark corners, drains and other harborage sites. When treating for bed bugs thoroughly clean, vacuum, and air mattresses and springs prior to treatment. Mix EcoEXEMPT® IC² at a rate of 1 to 4 ounces per gallon of water and apply as a spot treatment to cracks and crevices, around baseboards, floorboards, headboards, and walls. In hotels and other public lodging facilities pay special attention to luggage stands and the adjacent area. On mattresses and springs spot treat only areas that may harbor pests. Concentrate on tufts, seams, folds, and creases. Repeat as necessary. To prevent potential discoloring, do not spray on visible areas (i.e. baseboards, door frames, walls, etc.) and wipe away excess.

Food processing operations may continue when EcoEXEMPT® IC² is applied as a surface, spot or crack and crevice treatment in accordance with the directions and precautions given above.

FOGGING: To control crawling and flying insects (Moths and Flies, including House Flies, Horse Flies, Stable Flies, Horn Flies, Mosquitoes, Gnats, Fruit Flies, Phorid Flies, etc) in sites that include, but are not limited to, food processing plants, (INCLUDING USDA INSPECTED FACILITIES), industrial installations, animal quarters (cattle barns, horse barns, poultry barns, swine houses, zoos and warehouses), EcoEXEMPT® IC² may be applied as a space spray through conventional fogging equipment misting systems (including mist sprayers and mist blowers), automated spray systems, and/or related application technologies. Cover or remove exposed food and cover food-handling surfaces in edible product areas of food handling establishments. Also cover sensitive surfaces (plastics, etc). Close and shut off air conditioning or ventilating equipment. Mix 4 to 10 ounces of EcoEXEMPT® IC² insecticide with sufficient oil to equal 1 gallon of diluted spray. (It is recommended to use lower rates in most food facility applications). Apply at a rate of 1 to 3 fluid ounces per 1000 cubic feet, filling the room with mist (or fog, if thermal equipment is used). Keep area closed for at least 15 minutes. Vacate treated area. Ventilate before reoccupying. Fogging may create slippery conditions on painted floor surfaces. Retreat if reinfestation occurs.

The product does contain plant oils that are inherently fragrant. When used in confined spaces, prolonged exposure to the fragrance may be objectionable to some individuals. For additional information call 1-888-326-7233.

OUTDOOR USE

PERIMETER TREATMENTS AND RECREATIONAL AREAS: To control Aphids, Ants, Bees, Boxelder Bugs, Centipedes, Cockroaches, Crickets, Darkling Beetles, Firebrats, Fleas, Ground Beetles, Fowl Mites, Mites, Millipedes, Pillbugs, Silverfish, Sowbugs, Spiders, Ticks and Wasps. In compressed air sprayers, dilute 1 to 8 ounces of EcoEXEMPT® IC² per gallon of water (use lower rate for maintenance service and higher rates for active infestations) and apply at the rate of 2 gallons per 1000 square feet or until area is thoroughly wet. Also apply to a band of soil and vegetation 6 to 10 feet wide around and adjacent to buildings. Treat the building foundation to a height of 2 to 3 feet with sufficient water for coverage. Make special efforts to spray areas where pest species congregate such, but not limited to, as waste receptacles, dumpsters, unoccupied picnic tables, the exterior of food handling establishments, and food pavilions. Additionally apply around potential entry areas such as, but not limited to, eaves, windows, doorways, porches, porch lights, and around utility boxes. For power sprayers, mix approximately 1 to 6 ounces of EcoEXEMPT® IC² per gallon of water (use lower rate for maintenance service and higher rates for active infestations) and apply until area is sufficiently covered (usually min. 4 gallons per 1000 square feet.)

MATERIAL SAFETY DATA SHEET

EcoEXEMPT™ IC²

INSECTICIDE CONCENTRATE

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200, the EU Directive, 91/155/EEC and other regulatory requirements.

1. COMPANY & PRODUCT IDENTIFICATION

Product: EcoEXEMPT® IC²

EPA Reg. No.: Exempt

Manufacturer: EcoSMART Technologies, Inc.

318 Seaboard Lane, Suite 208, Franklin, TN 37067

For General Information: (888) 326-7233 (9am to 5pm CST)

Emergency Telephone Number:

InfoTrac Chemical Response System (800) 535-5053 (24 hours)

2. INGREDIENTS

Rosemary Oil (active ingredient)	Mineral Oil
% by weight: 10.0%	% by weight: 10 to 70%
CAS: 8000-25-7	CAS: 8042-47-5
Exposure Limits: None established	Exposure Limits: TWA: 5 mg/m ³ (OSHA)
Inert Essential Oils Blend	
% by weight: 10 to 70%	
Exposure Limits: None established	

3. HAZARDS IDENTIFICATION

Overview:

- Clear very pale yellow liquid with a faint minty scent.

Potential Health Effects: Prolonged exposure to this product may cause skin irritation, eye/nasal irritation, dizziness, headache or nausea. State of California requires any product containing 8.5% or more of Rosemary Oil must at a minimum bear the signal word "Caution," the phrase "Keep Out of Reach of Children," appropriate precautionary language, and a requirement for protective eyewear and gloves.

4. FIRST AID MEASURES

Eyes: Flush with plenty of water. Seek medical attention if irritation persists.

Skin: Wash with soap and water.

Inhalation: Remove exposed person to fresh air.

Ingestion: Rinse mouth out with plenty of water. Do not induce vomiting. Do not give anything by mouth to an unconscious person. Seek medical attention if feeling sick or nauseous.

5. FIRE FIGHTING MEASURES

Flashpoint (active ingredient): >145 degrees F (TCC)

Flammable Limits: Not tested

Extinguishing Media: Use Foam, Carbon Dioxide, or Dry Chemical extinguishers.

Fire and Explosion Hazards: The product is combustible.

Special Fire Fighting Procedures: None

Hazardous Decomposition Products: Carbon dioxide, carbon monoxide, smoke, fumes, and unburned hydrocarbons and terpenes.

6. SPILL/LEAK PROCEDURES

If spilled, absorb liquid with an inert absorbent material and dispose of the empty container and absorbent material in accordance with local ordinances. Components of this product are not considered EPA hazardous wastes.

7. HANDLING & STORAGE

Keep container tightly closed when not in use. Store only in the original container in a cool, dry place. Do not smoke or eat in the product handling area. Keep out of the reach of children and animals.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Ventilation: Local exhaust ventilation is not required. If large quantities are handled indoors, ensure adequate mechanical ventilation.

Respiratory Protection: Not required with adequate ventilation. If ventilation is poor and large quantities are being handled, wear a properly fitted half-face or full-face air-purifying respirator which is approved for pesticides (NIOSH/MSHA in U.S.).

Eye Protection: Safety glasses or chemical goggles.

Gloves: Wear Nitrile, Neoprene, or natural rubber gloves.

Other Protective Equipment: Not required.

9. PHYSICAL PROPERTIES

Appearance: Clear very pale yellow liquid

Odor: Faint minty scent

Specific Gravity: (water =1): 1.0 g/ml

10. STABILITY & REACTIVITY

Chemical Stability: Stable

Hazardous Polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

Rat Acute Oral: Not Determined

Acute effects from Overexposure: Prolonged contact with the skin may cause irritation, and contact with the eyes may cause eye irritation. Inhalation of the vapor may cause irritation of nasal passages and/or dizziness. Ingestion of this product could result in irritation of the gastrointestinal tract, headache or nausea.

Chronic Effects from Overexposure: No data are available.

Carcinogenicity: NTP: No OSHA: No

12. ENVIRONMENTAL INFORMATION

While specific data regarding toxicity to fish or other aquatic organisms is not available for this product, care should always be taken to prevent pesticides from entering aquifers.

13. DISPOSAL

Do not reuse empty container. Triple rinse empty container then puncture container and recycle if possible. If recycling is not possible, triple rinse empty container then puncture container and dispose of container in a sanitary landfill, or incinerator, or if allowed by state and local regulations, by burning. If burned, stay out of smoke.

14. TRANSPORTATION INFORMATION

Ground: Not DOT regulated in available quantities (ref: CFR 49 § 173.150 (f))

Air: Aviation Regulated Liquid, N.O.S. (contains Rosemary Oil), Class 9, UN3334, PG III

International: Contact EcoSMART Technologies:
Telephone (888) 326-7233 (9am to 5pm EST)

15. REGULATORY INFORMATION

NFPA Ratings: Health - 1 Fire - 2 Reactivity - 0 Special - none

SARA Title III: This product does not contain any ingredients subject to Section 313 (40 CFR 372) reporting requirements.



EcoSMART
Technologies, Inc.

EcoSMART Technologies, Inc.
318 Seaboard Lane, Suite 208
Franklin, Tennessee 37067
Phone: (888) 326-7233
(615) 261-7300
Fax: (615) 261-7301

Revised July 2005.

EcoEXEMPT Products: Insecticide Concentrates

Product Application Tips:

- Recommended Dilution rates:
 - General Pest Control Treatments: Mix 3 oz. EcoEXEMPT IC-2 and 1 oz Adjuvant per gallon
 - Bed Bug and Tick Treatments: Mix 6 oz. EcoEXEMPT IC-2 and 2 oz. Adjuvant per gallon
 - Backpack Fogging: Mix 6 oz. EcoEXEMPT IC-2 and 2 oz. Adjuvant per gallon
 - Stinging Insect Treatments: Mix 8 oz. EcoEXEMPT IC-2 and 3 oz. Adjuvant per gallon
 - Power Spraying for Mosquitos: Mix 1.5 oz. EcoEXEMPT IC-2 and .5 oz. Adjuvant per gallon
 - Power Spraying Dams for Spiders: Mix 8 oz. EcoEXEMPT IC-2 and 3 oz. Adjuvant per gallon

• EcoEXEMPT IC-2 Sample Dilution Calculation

EcoExempt IC-2 contains 10% rosemary oil and 2% peppermint oil. If you put 4 oz of IC-2 in one gallon of water, what is the rosemary concentration and the peppermint in the final mixture?

There are 128 oz in a gallon. Thus 4 oz in 1 gallon represents a 4 in 128 (or a 1 in 32) dilution factor or $4/128 \times 100 = 3.125\%$ formula. Therefore starting from a conc. of 10% (rosemary) we now have 10% of 4/128 (3.125) = 0.3125% rosemary in the finished mix. Plus a conc. of 2% (peppermint) we now have 2% of 4/128 (3.125) = 0.06% peppermint in the finished mix.

Ounce(s) of formulation per gallon of water ^A	% concentration of AI in final solution rosemary (10%)	% concentration of AI in final solution peppermint (2%)
1	0.08	0.02
2	0.16	0.03
3	0.23	0.05
4	0.31	0.06
5	0.39	0.08
6	0.47	0.09
7	0.55	0.11
8	0.63	0.13
9	0.70	0.14
10	0.78	0.16

^A For a formulation containing 12% AI

Troubleshooting Guide

Problem:	Possible Causes/Solutions:
Not effective	<ul style="list-style-type: none"> • Thoroughly shake the container before using • Thoroughly mix dilution as outlined in the label instructions • Maintain constant agitation, or re-agitate the tank mix if left standing every hour
Lingering fragrance	<ul style="list-style-type: none"> • Explain to customer fragrance is from natural plant oils (not harmful) • Avoid applications in damp areas • Overspray the area with Febreze^{®*} (odor eliminator) <p><small>* registered trademark of Proctor & Gamble</small></p>
Possible staining	<ul style="list-style-type: none"> • It is recommended to test a small inconspicuous area first if in doubt • Thoroughly mix dilution as outlined in the label instructions • Maintain constant agitation, or re-agitate the tank mix if left standing every hour • If stain detected, wash area with warm soapy water • Porous surfaces may require time (often several days) to dissipate
Clogged sprayer	<ul style="list-style-type: none"> • Spray equipment should be thoroughly cleaned and rinsed daily • Thoroughly mix dilution as outlined in the application tips section above • Maintain constant agitation, or re-agitate the tank mix if left standing every hour
Spray equipment seals fail/leak/swell	<ul style="list-style-type: none"> • If necessary, replace seals with Teflon seals • Contact company for information on equipment component compatibility

CUTTING EDGE FORMULATIONS, INC.

Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: AvengerAG® Burndown Herbicide Concentrate

EPA Reg. Number.: 82052 – 4

Description: Liquid Herbicide Concentrate

Chemical Composition: Liquid Concentrate

Company:

Cutting Edge Formulations, Inc., 3057 Summer Oak Place, Buford, GA, 30518

Telephone: 678-546-5009 • **Website:** avengerorganics.com • **Email:** support@avengerorganics.com

Emergency Phone Number: CHEMTREC 24 Hour Number (800) 424-9300

2. HAZARD(S) IDENTIFICATION

CAUTION!

Health Hazards: Harmful if absorbed through skin. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing.

Signs and Symptoms of Exposure: Product may be irritating to the skin, eyes, nose and throat.

Medical Conditions Generally Aggravated by Exposure: Persons with allergies or pre-existing skin conditions should avoid contact with this product.

Hazardous Materials Identification System - HMIS:

- 1 Health Hazard - Mild skin irritant
- 2 Flammability - Flashpoint 123° F (50°C), as determined by TAG Closed Cup
- 0 Reactivity - Stable
- G Protection - Safety glasses, gloves

7. HANDLING AND STORAGE

Precautions to be Taken in Handling and Storing: Take usual precautions for combustible liquids. Store in original container and out of the reach of children, preferably in a locked storage area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal Protective Equipment (PPE): Applicators and other handlers must wear: Long sleeved shirt and pants, Shoes plus socks and Protective eyewear.

- **Eye Protection:** Safety goggles or glasses suggested.
- **Skin Protection:** Oil resistant gloves.
- **Appropriate Hygienic Practices:** Wash thoroughly after handling. Launder contaminated clothing before re-use.

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

Engineering controls: No special requirement when used as recommended.

Respiratory protection: No special requirement when used as recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear, slight yellow liquid
Upper/lower flammability or explosive limits	N/A
Odor	Orange or lemon-lime aroma
Vapor pressure	N/A
Odor threshold	N/A
Vapor density	N/A
pH:	Aqueous mixture containing 1% v/v of Concentrate has a pH of 6 at 73°F (23°C)
Relative density	N/A
Melting point/freezing point	N/A
Solubility(ies)	N/A
Initial boiling point and boiling range	N/A
Flash point	125°F (50°C), as determined by TAG Closed Cup
Evaporation rate	N/A
Flammability (solid, gas)	N/A
Upper/lower flammability or explosive limits	N/A
Vapor pressure	N/A
Vapor density	N/A
Relative density	N/A
Solubility(ies)	N/A
Partition coefficient: n-octanol/water	N/A
Auto-ignition temperature	N/A
Decomposition temperature	N/A
Viscosity	6.0 cps (#2 spindle at 30 RPM, at 21°C)
Gravity	0.886 g/ml (7.40 lb./gal) at 21°C

13. DISPOSAL CONSIDERATION

Container Disposal: DO NOT reuse any part of this packaging. Dispose of all containers and packaging in a sanitary landfill, by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of the smoke..

14. TRANSPORTATION INFORMATION

TDG Status: Hazardous DOT Label/Placard [exemption § 173.150(f) applies

IMO Status: Hazardous Highway/Rail: per requirements for Combustible Liquids

IATA Status: Hazardous Air/Ship: per requirements for Flammable Liquids

SHIPPING CLASSIFICATION:

- Proper Shipping Name: TERPENE HYDROCARBONS, N.O.S.
- Hazard Class: 3
- Identification No.: UN2319
- Packing Group: III
- The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.

15. REGULATORY INFORMATION

Registration for use as a herbicide has been approved at the U.S. Environmental Protection Agency (EPA). EPA Registration No. 82052 – 4

15. OTHER INFORMATION

National Fire Protection Association Hazard Ratings - NFPA(R):

- 1 Health Hazard - Slight
- 2 Flammability - Moderate
- 0 Reactivity - Minimal

Key Legend Information:

- ACGIH American Conference of Governmental Industrial Hygienists
- OSHA Occupational Safety and Health Administration
- NTP National Toxicology Program
- IARC International Agency for Research on Cancer 4

The information contained herein is based on current knowledge and experience: no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information obtained by the user. No warranty is expressed or implied regarding the accuracy of this data, the results to be obtained from the use thereof, or that any such use will not infringe any patent. Users should make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials, the safety and health of employees and customers, and the protection of the environment. This information is furnished upon the condition the person receiving it shall determine the suitability for the particular purpose. This SDS is to be used as a guideline for safe work practices and emergency response.

FIRST AID	
If in Eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. • Call a poison control center or doctor for treatment advice.
If on Skin or Clothing	<ul style="list-style-type: none"> • Remove contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Wash exposed area with soap and water. If irritation persists, seek medical attention. • Call a poison control center or doctor for treatment advice.
HOT LINE NUMBER	
<p>Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact the National Poison Control Hotline at 1-800-222-1222 for emergency medical treatment information 24 hours a day, 7 days a week.</p>	
NOTE TO PHYSICIAN:	
<p>Probable mucosal damage may contraindicate the use of gastric lavage.</p>	

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS**

WARNING: Causes substantial but temporary eye injury. Do not get in eyes or on clothing. Avoid contact with skin and clothing. Wear protective eyewear such as goggles, face shield, or safety glasses. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

ENVIRONMENTAL HAZARDS

For terrestrial uses: Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

Do not apply this product or allow it to drift to blooming crops or weeds while honey bees are actively foraging in the treatment area. For maximum honey bee protection, avoid early morning and late afternoon applications.

PRODUCT INFORMATION

SUPPRESS® Herbicide EC is a non-selective, post-emergent, foliar herbicide for use in and around all food crop areas.

SUPPRESS® Herbicide EC provides effective control of annual and perennial broadleaf weeds and grasses. **SUPPRESS® Herbicide EC** is most effective on weeds that are less than 6 inches in height.

SUPPRESS® Herbicide EC is non-systemic and it does not translocate within the plant.

DIRECTIONS FOR USE

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

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

FOR USE in and AROUND ALL FOOD and NON-FOOD CROPS, INCLUDING, but not LIMITED to:

Berries	Blackberries, Blueberries, Boysenberries, Cranberries, Dewberries, Loganberries, Raspberries
Brassicas (Cole)	Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Collards, Kale, Mustard Greens
Bulb Vegetables	Garlic, Leaks, Onions, Shallots
Citrus	Grapefruits, Lemons, Oranges, Mandarins, Limes
Cucurbit Vegetables	Cantaloupe, Cucumber, Gourd, Muskmelon, Pumpkin, Squash, Watermelon
Field Crops	Alfalfa, Canola, Cereal Grains, Corn, Cotton, Sorghum, Soybeans, Sweet Corn
Fruiting Vegetables	Peppers (All Varieties), Tomatillos, Tomatoes, Eggplant
Grapes	Raisin, Table Grapes, Wine Grapes
Leafy Greens	Arugula, Lettuce, Spinach, Celery
Legumes	Beans, Garbanzo, Lentils, Peas
Tree Nuts	Almonds, Cashews, Pecans, Pistachios, Walnuts
Pome Fruit	Apples, Crabapples, Pears, Quince
Stone Fruit	Apricot, Cherries, Nectarines, Peaches, Plums, Prunes
Strawberries	June-bearing, Everbearing, and Day-neutral
Root & Tuber Vegetables	Beets, Carrots, Potatoes, Potato Seed, Radishes, Sweet Potatoes
Tropical Fruits	Guavas, Mangos, Kiwi Fruit, Bananas
Miscellaneous Crops	Avocados, Persimmons, Pomegranates

Repeat applications as required to maintain desired level of weed control and to control plants emerging from seed and underground parts.

Desired Volume of Spray Solution (gallons of water)	Amount of SUPPRESS® Herbicide EC per Volume of Water (Volume/Volume)		
	3% Solution	6% Solution	9% Solution
1	4 fl oz	8 fl oz	12 fl oz
2.5	10 fl oz	20 fl oz	29 fl oz
25	96 fl oz	1.5 gal	2.25 gal
50	1.5 gal	3 gal	4.5 gal
70	2.1 gal	4.2 gal	6.3 gal
100	3 gal	6 gal	9 gal

MIXING INSTRUCTIONS: Fill tank sprayer with half of the recommended water, then add the appropriate amount of **SUPPRESS® Herbicide EC**. Fill tank with the remaining amount of water. When spraying the solution, **use continuous agitation until all spray solution has been applied**. Apply spray solution in properly maintained and calibrated equipment capable of delivering the desired volumes. Apply spray solution as needed to control newly emerged weeds. Use spray solution within 4 hours of mixing.

STORAGE AND DISPOSAL

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

PESTICIDE STORAGE: Store **SUPPRESS® Herbicide EC** in a cool place out of direct sunlight.

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

CONTAINER HANDLING [for containers less than 5 gallons]: Non-refillable container. Do not reuse or refill this container. Triple rinse (or equivalent) container promptly after emptying, then offer for recycling, if available; or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or, if allowed by state and local authorities, by incineration. If burned, stay out of smoke. Triple rinse as follows: empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling, if available, or puncture or dispose of in a sanitary landfill, or by incineration. Do not burn unless allowed by state and local ordinances.

CONTAINER HANDLING [for containers greater than 5 gallons]: Non-refillable container. Do not reuse or refill this container. Triple rinse (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into the application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Then offer for recycling, if available, or puncture or dispose of in a sanitary landfill, or by incineration. Do not burn unless allowed by state and local ordinances.

Batch Number:

NOTICE OF WARRANTY - Westbridge warrants that the product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with the directions under normal conditions of use. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application, all of which are beyond the control of Westbridge. To the extent consistent with applicable law, Westbridge shall not be liable for consequential, special or indirect damages resulting from the use or handling of this product. Westbridge's liability is limited to replacement of product or refund of purchase price. Westbridge makes no warranties of merchantability or fitness for a particular purpose nor any other express or implied warranty except as stated above.

1. PRODUCT AND COMPANY IDENTIFICATION

TRADE NAME: SUPPRESS® Herbicide EC
MANUFACTURER'S NAME: Westbridge Agricultural Products
ADDRESS: 1260 Avenida Chelsea, Vista, CA 92081
TELEPHONE NO.: (800) 876-2767
POISON CONTROL TELEPHONE: (800) 222-1222
COMPOSITION: Fatty Acids (Caprylic-Capric Acids)
RECOMMENDED USE: A Liquid Herbicide Concentrate For Agricultural Use.

2. HAZARD IDENTIFICATION
CLASSIFICATION:

Irritant


SIGNAL WORD:

WARNING. Causes substantial but temporary eye injury. Do not get in eyes or on clothing. Avoid contact with skin and clothing. Wear protective eyewear such as goggles, face shield, or safety glasses. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

OTHER HAZARDS:

SUPPRESS® Herbicide EC does not contain toxic chemicals in concentrations subject to the reporting requirements of OSHA or Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 or 40 CFR Part 372.

3. COMPOSITION INFORMATION

<u>COMPOSITION</u>	<u>Concentration %</u>	<u>CAS Number</u>
Caprylic Acid	47.0%	124-07-2
Capric Acid	32.0%	334-48-5
Inert Ingredients	21.0%	N/A

4. FIRST AID MEASURES

If on Skin OR Clothing:	Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
If on Eyes:	Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, and then continue rinsing. Call a poison control center or doctor for treatment advice.
If Inhaled:	Move person to fresh air. If person is not breathing, call 911 or an ambulance, and then give artificial respiration. Call poison control center or doctor for treatment advice.
If Swallowed:	Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything to an unconscious person.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

NOTES TO PHYSICIAN: Treat patient symptomatically.

5. FIRE-FIGHTING MEASURES

GENERAL INFORMATION: THIS PRODUCT IS NOT FLAMMABLE
FLASH POINT: N/A
TEST METHOD: N/A
EXTINGUISHING MEDIA: N/A
SPECIAL FIRE FIGHTING PROCEDURES: N/A

AUTOIGNITION TEMPERATURE: N/A
FLAMMABLE: This product is not flammable
UNUSUAL FIRE AND EXPLOSION HAZARD: N/A

10. STABILITY AND REACTIVITY DATA

GENERAL INFORMATION: Stable under recommended storage conditions.

CORROSIVE: YES NOSTABILITY: stable unstable

INCOMPATIBILITY (materials to avoid): N/A

HAZARDOUS DECOMPOSITION/COMBUSTION PRODUCTS: N/A

HAZARDOUS POLYMERIZATION: N/A

11. TOXICOLOGICAL INFORMATION**SYMPTOMS OF OVEREXPOSURE**

INHALATION: None expected.

SKIN CONTACT: Potential mild skin irritation.

SKIN ABSORPTION: None expected.

EYE CONTACT: Causes substantial but temporary eye injury.

INGESTION: None expected.

EFFECTS OF OVEREXPOSURE

ACUTE OVEREXPOSURE: Expected toxicity none to slight.

CHRONIC OVEREXPOSURE: Expected toxicity none.

SUSPECTED CANCER AGENT? NO: This product's ingredients are not found in the lists below. YES: Federal OSHA NTP IARC Cal/OSHA Prop 65**12. ECOLOGICAL INFORMATION**

ENVIRONMENTAL EFFECTS: No known significant effects or critical hazards.

13. DISPOSAL PROCEDURES

WASTE DISPOSAL METHOD: Follow all applicable Federal, State and local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any byproducts should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

CAUTION: Do not contaminate soil, surface water, drains, sewers or ditches with product or used containers.

14. TRANSPORT INFORMATION

D.O.T.: Not D.O.T. Regulated.

IATA CLASSIFICATIONS: Substances Not Regulated.

IATA HAZARD CLASS/DIVISION: Substances Not regulated

PACKING MATERIALS: HDPE Containers

15. REGULATORY INFORMATION

EPA REG. NO.: N/A

ORGANIC CERTIFICATION: Yes – Organic Materials Review Institute (OMRI)

PROPOSITION 65 (CA): N/A.

SARA TITLE III, SECTION 313 TOXIC CHEMICALS: None.

16. OTHER INFORMATION

All information, recommendations and suggestions appearing herein concerning our products are based upon tests and data believed to be reliable. However, it is the user's responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, we make no guarantee, expressed or implied, as to the effects of such use, the results to be obtained, or the safety and toxicity of the product; nor do we assume any liability arising out of use, by others, of the product referred to herein. The information herein is not to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

®BioLink is a registered trademark of Westbridge Agricultural Products.

PREPARED BY: Ivonne Sanchez, Regulatory/R&D Coordinator at Westbridge Agricultural Products
PREPARED DATE: November 25, 2013 REV. DATE: September 25, 2014 IS

Non-WPS Uses: Applicators and other handlers who handle this pesticide for any use NOT covered by the Worker Protection Standard (40 CFR Part 170) - in general, only agricultural uses are covered - must wear:

- Long-sleeved shirt and long pants
- Chemical resistant-gloves such as barrier laminate, nitrile rubber, or neoprene rubber
- Protective eyewear (goggles, face shield or safety glasses)

User Safety Recommendations

Users should:

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

Environmental Hazards

Do not apply directly to water, areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

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

Agricultural Use Requirements

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

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, include:

- Coveralls worn over short-sleeved shirt and short pants
- Chemical resistant-gloves such as barrier laminate, nitrile rubber, or neoprene rubber
- Chemical-resistant footwear plus socks
- Protective eyewear (goggles, face shield or safety glasses)

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses. Keep unprotected persons out of the treated areas until the sprayed area is dry.

PRODUCT INFORMATION

Scythe[®] herbicide is a contact non-selective, broad spectrum, foliar-applied herbicide. This product will only control actively growing emerged green vegetation. It provides burndown of both annual and perennial broadleaf and grass weeds, as well as most mosses and other cryptogams. The degree of burndown and the longevity of control is less when the plants are inactive, mature, or biennial/perennial types.

This product is not translocated. It will burn only those plant parts that are coated with spray solution.

This product is a non-volatile, emulsifiable concentrate. It can be applied through most standard or field type sprayers after dilution and mixing with water in accordance with label instructions. For best results, uniform and complete coverage of target plants is required.

Visible effects on most weeds occur within hours. This product does not damage mature, non-green, woody parts of plants. Cool weather following treatment slows the activity of this product and delays or reduces visual effects.

This product provides no residual weed control. Repeat treatments will be necessary for new plants emerging from seed or regrowth of treated vegetation. Should residual control be desired, use a product labeled for the use situation.

Mixing and Application Instructions

Apply spray solutions in properly maintained and calibrated equipment capable of delivering desired volumes. Avoid spraying or allowing drift to desirable plants. Always clean tank, pump, and line thoroughly with water after use.

Do not apply this product through any type of irrigation system.

Do not apply this product aerially.

Adjust spray droplet size to minimize drift and allow application to the intended exposure area only.

Mixing

This product mixes readily with water. To prepare the spray mixture, fill the mix or spray tank with three-fourths the required amount of water then add the proper amount of this product. Complete filling the mix or spray tank with the balance of water needed. Remove hose from tank immediately after filling to avoid siphoning back into the carrier source. Mix well.

During mixing and application, foaming of the spray solution can occur. A defoaming agent can be added to prevent excessive foaming. If application is intended in or around crops, the defoaming agent must be approved for such use.

Always determine compatibility of companion herbicides and tank additives prior to addition to the spray tank. Determine compatibility by performing a jar test using appropriate quantities of each material and water (see Tank Mixes).

For best results with backpack or other small tank applicators ensure thorough mixing of herbicidal solution at filling and during the spray operation. For sprayers without agitation, mix or shake regularly to maintain suspension. Without agitation, this product separates quickly out of the spray solution.

Use Methods

See the "Use Sites" section of this label to match the method of use with the crop or use situation.

- Vegetative Burndown:** General control of weeds for seedbed or site preparation, non-crop and around aquatic sites. Spot treatments may be used in crop and pasture situations.
- Directed and Shielded Sprays:** Applications may be made in and around desirable plants when contact of foliage and green bark is avoided.
- Prior to Emergence of Plants from Seed, Perennial Rootstocks, Corms and Bulbs:** Ensure applications are made before new growth or crop emerges from soil or damage will occur.
- Dormant or Post Harvest Spray:** For control of weeds growing in dormant turf or fields after this commodity has been harvested. Partially green growth will be killed or stunted.
- Sucker Control, Pruning and Trimming:** To burn back unwanted basal sucker growth on woody trees and foliage growth on vines, and excessive cane growth in brambles. Apply only to unwanted vegetative parts. Apply before suckers become woody.
- Harvest Aid and Desiccation:** To remove leaves of plants prior to harvest and/or burndown of weeds to facilitate harvest. Harvest aid and desiccation uses include applications to root and tuber vegetables, bulb vegetables and cotton only. Applications must be made no later than twenty-four hours prior to harvest (pre-harvest interval = 24 hours).
- Structural and Building Applications:** Apply to unwanted vegetation in and around buildings and structures. Application to walks, benches, walls, floors, roofs, or cooling pads for the control of moss and certain algae. A temporary residue or precipitate can result when used on some types of concrete, masonry, brick or stone.

Use Sites

Care must be exercised to avoid contact of spray with foliage of desirable turfgrasses, trees, shrubs, or other desirable vegetation since damage can result. Best results are obtained when applications are made to young succulent weeds and when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.

Select nozzles/pressure combinations that deliver large coarse droplets such as solid cones or flat fans at low pressures, and avoid nozzle/pressure combinations that generate fine particles or mist. If spraying areas adjacent to desirable plants, use a shield to help prevent spray from contacting foliage of desirable plants. Reseeding or transplanting can occur in treated areas as soon as desirable levels of weed control are obtained.

Crop Uses and Use Methods

Use Methods: See the corresponding numbers in the "Use Methods" section under "General Information" for use descriptions and precautions.

Crop Group	Crops	Use Methods
Root Tuber and Perennial Vegetables	Asparagus, artichoke, beet, carrot, ginger, ginseng, horseradish, parsnip, potato, radish, rutabaga, sweet potato, turnip and yam † Harvest Aid and Desiccation uses are approved only for root and tuber vegetables in this crop group.	1,2,3,4,6 †
Bulb Vegetables	Garlic, leek, onion, and shallot	1,2,3,6
Leafy Vegetables	Celery, cilantro, cress, endive, fennel, lettuce, parsley, rhubarb, spinach, Swiss chard	1,2
Cole or Brassica Crops	Broccoli, brussels sprouts, cabbage, cauliflower, collards, kale, kohlrabi, greens (mustard and turnip)	1,2,3
Legume Vegetable	Beans (<i>Phaseolus</i> spp. such as: field green, kidney, lima, mung, navy, pinto, snap, and wax beans) (<i>Vigna</i> spp. such as: black-eyed, Chinese longbean, cowpea, and southern pea) peas (<i>Pisum</i> spp. such as: garden, green, sugar, and snow peas), lentil, and soybean	1,2,3
Fruiting Vegetables	Eggplant, okra, pepper (bell, chili, sweet), pimento, and tomato	1,2,3
Cucurbits and Melons	Cucumber, gourd, muskmelon, cantaloupe, pumpkin, squash, and watermelon	1,2,3
Citrus	Grapefruit, kumquat, lemon, lime, orange, tangerine, and tangelo	1,2
Pome Fruit	Apple, crabapple, pear, and quince	1,2,5
Stone Fruit	Apricot, cherry, nectarine, peach, plum and prune	1,2,5
Small Fruit, Berries, and Grapes	Blackberry, blueberry, boysenberry, cranberry, currant, dewberry, grape (all types), loganberry, olallieberry, raspberry, and strawberry	1,2,3,5
Nuts	Almond, brazil nut, chestnut, filbert, macadamia, pecan, pistachio, and walnut	1,2,5
Tropical and Other Fruit	Avocado, banana, coconut, date, fig, guava, kiwi, mango, olive, persimmon, papaya and pineapple	1,2,5
Field Crops and Cereal Grains	Barley, buckwheat, canola, corn (field, popcorn, and sweet corn), cotton, cowpea, millet, oat, peanut, rice, rye, safflower, sorghum, sugarcane, sunflower, and wheat † Harvest Aid and Desiccation uses are approved only for cotton within this crop group.	1,2,3,6 †
Forages and Pasture Grasses (Forage or Seed)	Alfalfa, clovers, trefoil, vetch, brome grass, fescue, bluegrass, lespedeza, ryegrass, sudangrass, timothy, range grasses, and crops grown for livestock feed	1,3,4
Herbs & Spices	Anise, basil, caraway, chive, cumin, curry, dill, fennel, oregano, mints, rosemary, sage, savory, sweet bay, tarragon, thyme and wintergreen	1,2,3,4
Beverage and Specialty Crops	Cocoa, coffee, hops, tea, tobacco, and jojoba	1,2,5



MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Formulator: Gowan Company
P.O. Box 5569
Yuma, Arizona 85366-5569
(800) 883-1844

Emergency Phone: (928) 783-3803
For 24-Hour Emergency Assistance (Spill, Leak, Fire, or Exposure), Call CHEMTREC®: Inside the U.S.: (800) 424-9300
Outside the U.S.: (703) 527-3887
(888) 478-0798

For Medical Emergency:

Product: Scythe® Herbicide
EPA Signal Word: Warning
EPA Registration No.: 10163-325

2. HAZARDS IDENTIFICATION

Physical Properties

Appearance: Colorless to yellow liquid
Odor: Waxy

Hazards of product:

WARNING! May cause severe eye irritation. Causes skin irritation. May cause respiratory tract irritation.

OSHA Hazard Communication Standard

This product is a "hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause severe eye irritation. May cause corneal injury.

Skin contact: Prolonged or repeated exposure may cause moderate skin irritation.

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Inhalation: Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs.

Ingestion: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

3. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS #
Pelargonic acid (57%)	112-05-0
Solvent refined heavy paraffinic distillate (petroleum) (0.3-10.5%)	64741-88-4
Petroleum distillates, solvent-dewaxed, heavy paraffinic (19.5-29.7%)	64742-65-0

Only the identities of the active ingredient(s) and any *hazardous* inert ingredients are listed. Specific information on all of this product's ingredients can be obtained by the treating medical professional or spill emergency responder for the management of exposures, spills, or safety assessments.

4. FIRST AID MEASURES

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

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

Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc.). Call a poison control center for treatment advice.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits

Component	List	Type	Value
Solvent refined heavy paraffinic distillate (petroleum)	OSHA Table Z-1	PEL	2,000 mg/m ³ 500 ppm
Petroleum distillates, solvent-dewaxed, heavy paraffinic	OSHA Table	PEL	2,000 mg/m ³ 500 ppm

Manufacturing and Packaging Employees

Eye/Face	Use chemical goggles
Skin Protection	Wear clean, body-covering clothing
Hand protection:	Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: chlorinated polyethylene, neoprene, polyethylene, ethyl vinyl alcohol laminate (EVAL), polyvinyl chloride (PVC or vinyl), Viton. Examples of acceptable glove barrier materials include: butyl rubber, natural rubber (latex), nitrile/butadiene rubber (nitrile or NBR), polyvinyl alcohol (PVA).
Respiratory Protection	Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge,
Ingestion	Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.
Engineering Controls Ventilation	Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Colorless to yellow
Odor:	Waxy
Flash Point:	>94°C (>200.1°F) <i>Closed Cup</i>
Flammable Limits in Air	Lower: No test data available Upper: No test data available
Autoignition Temperature	No test data available
Vapor Pressure	20 mmHg @ 153°C <i>Literature</i>
Boiling Point (760 mmHg):	230-237°C (446 - 459°F) <i>Literature</i>
Vapor Density (air = 1)	No test data available
Specific Gravity (H ₂ O =1)	0.9 <i>Literature</i>
Freezing Point	No test data available
Melting Point:	12.5° C (54.5° F) <i>Literature</i>
Solubility in Water (by weight)	emulsifies in water
pH	3.8 (1% aqueous solution) <i>Literature</i>

10. STABILITY AND REACTIVITY

Stability:	Unstable at elevated temperatures
Hazardous Polymerization:	Will not occur
Thermal Decomposition:	Decomposition products depend upon temperature, air supply and the presence of other materials.
Conditions To Avoid:	Exposure to elevated temperatures can cause product to decompose.

12. ECOLOGICAL INFORMATION - continued

Solvent refined heavy paraffinic distillate (petroleum)

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, rainbow trout (*Oncorhynchus mykiss*), 96 h: >1,000 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea (*Daphnia magna*), 48 h, immobilization: >1,000 mg/l

Aquatic Plant Toxicity

EC50, green alga (*Selenastrum capricornutum*), biomass growth inhibition, 96 h: >1,000 mg/l

Petroleum distillates, solvent-dewaxed, heavy paraffinic

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, rainbow trout (*Oncorhynchus mykiss*), 96 h: >1,000 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea (*Daphnia magna*), 48 h, immobilization: >1,000 mg/l

Aquatic Plant Toxicity

EC50, green alga (*Selenastrum capricornutum*), biomass growth inhibition, 96 h: >1,000 mg/l

13. DISPOSAL CONSIDERATION

If wastes and/or containers cannot be disposed of according to the product label directions, disposal of the material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with the applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

14. TRANSPORT INFORMATION

DOT Classification

Not regulated

IMDG Classification

Not regulated

IATA Classification

Not regulated

15. REGULATORY INFORMATION

SARA Title III Classification Sections 311 and 312

Immediate (acute) health hazard Yes

Delayed (chronic) health hazard No

Section 313 chemical(s): To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS No.	Amount
Solvent refined heavy paraffinic distillate (petroleum)	64741-88-4	≥0.3 - ≤10.5%
Paraffinic distillate	64742-65-0	≥19.5 - ≤29.7%

Proposition 65

Not applicable

CERCLA Reportable Quantity (RQ)

Not applicable

Final-San-O

NON-SELECTIVE GRASS AND BROADLEAF HERBICIDE

 FOR ORGANIC PRODUCTION

ACTIVE INGREDIENT:	
Ammoniated soap of fatty acids	22%
OTHER INGREDIENTS:	78%
TOTAL	100%

Net Contents: 2.5 Gallons
EPA Reg. No. 67702-34-70051
EPA Est. No. 48498-CA-1

Manufactured for
Certis USA, LLC
9145 Guilford Rd, Suite 175
Columbia, MD 21046
Tel: 800-847-5620

CERTIS



Sold under a license of
Neudorff GmbH KG

**KEEP OUT OF REACH OF CHILDREN
WARNING AVISO**

FIRST AID	
IF IN EYES	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice
IF ON SKIN OR CLOTHING	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
IF INHALED	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
<p>Have the product container or label with you when calling a poison control center or doctor or going for treatment.</p>	

Personal Protective Equipment (PPE) Requirements:

Applicators and other handlers must wear: coveralls worn over short-sleeved shirt and short pants, socks, chemical-resistant footwear, waterproof gloves and protective eyewear. When cleaning equipment a chemical-resistant apron should also be worn.

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

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

USER SAFETY RECOMMENDATIONS
Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This product is hazardous to aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing equipment washwaters.

PRODUCT INFORMATION

- Contains an herbicidal soap concentrate for weed control.
- Able to use around raised beds, containers, planters, and other structures holding vegetables, trees, flowers, and shrubs; in planting beds prior to planting vegetables, trees, flowers, or grass; and around ornamental flowers, mature shrubs and trees, spot treatment in lawns bordering garden areas and bark mulch.
- Fast acting formula kills weeds, grasses, unwanted vegetation, moss, and algae within hours.
- Overspray will not stain bricks, woods, concrete, pavement, or asphalt.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

WARNING: Causes skin irritation. Causes substantial but temporary eye injury. Harmful if inhaled. Do not get in eyes, on skin or on clothing. Avoid breathing spray mist. Wear long-sleeved shirt and long pants, socks, chemical-resistant footwear and gloves. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove contaminated clothing and wash before reuse. Wear protective eyewear (goggles, face shield or safety glasses).

Certis U.S.A., LLC
9145 Guilford Road, Suite 175
Columbia, Maryland 21046

EMERGENCY TELEPHONE NUMBER

CHEM•TEL (800) 255-3924
Outside North America Call Collect (813) 248-0585

PRODUCT INFORMATION

Trade Name: Final-San-O (EPA Reg. No. 67702-34-70051)
Description: Salts of fatty acids
Active Ingredients: Ammoniated soap of fatty acids

PHYSICAL DATA

Appearance:	Clear colorless liquid	Density at 25°C:	1.00 ± 0.03 g/mL
Water Solubility:	Miscible in all proportions	pH:	8.40 ± 0.10
Odor	Odor of soap and ammonia	Flash Point:	Not Applicable

HEALTH HAZARDS / EFFECTS

Hazard Information:	Eye Irritant
LD ₅₀ (oral):	>5,000 mg/kg
LD ₅₀ (dermal):	>5,000 mg/kg
Routes of Entry:	Inhalation, skin
Skin:	May cause irritation
Eyes	Can be expected to cause moderate irritation
Ingestion:	May cause irritation
Inhalation	Can be expected to cause irritation if fine droplets are inhaled
Medical Conditions Aggravated	Chronic skin, eye or respiratory disease.
Carcinogen or Potential Carcinogen	NTP: no IARC: no OSHA: no

EMERGENCY AND FIRST AID PROCEDURES

Skin:	Wash with soap and water.
Eyes:	Flush eyes for at least 15 minutes, consult a physician.
Inhalation:	Remove to fresh air. If irritation persists consult a physician.
Ingestion:	Drink a quantity of water.

CERTIS

ENGAGE AGRO USA

FIESTA TURF WEED KILLER

Active Ingredient:

Iron HEDTA (FeHEDTA)	26.52%
Other Ingredients:	73.48%
Total:	100.00%

NOT FOR USE IN CALIFORNIA

KEEP OUT OF REACH OF CHILDREN

CAUTION

FIRST AID	
IF IN EYES	- Hold eye open and rinse slowly and gently with water for 15-20 minutes. - Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. - Call a poison control center or doctor for treatment advice.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.	

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Causes slight eye irritation. Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum or using tobacco. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

EPA Reg. No. – 67702-26-87865

EPA Establishment No. – 58996-MO-1

Manufactured For:
Engage Agro USA, LLC
118 E. Carleton Street, Suite A
Prescott, AZ 86303
Phone: 928-445-7990

Application Directions – Broadcast Treatment

Rate of Spray Solution	Rate of Concentrate	Weeds Controlled	Area Treated
2.8 fl. oz./yd ² Or 2.5 ga/1000ft ²	12.6 fl. oz/ 1000ft ²	Rate for easy-to-control weeds: black medic, slender speedwell, wild geranium and moss. This rate can also be used for weed seedlings of: false dandelion, English daisy, dandelion or white clover.	25400 ft ² /2.5 G jug
5.7 fl. oz./yd ² Or 4.9 ga/1000ft ²	25.2 fl. oz/ 1000ft ²	Standard rate for control of most weed species: dandelion, English daisy, false dandelion, white clover, bull thistle, Canada thistle, common chickweed, narrow-leaved plantain, dove's foot geranium, lawn burweed, and algae, and for the SUPPRESSION of broad-leaved plantain.	12700 ft ² /2.5 G jug
11.3/yd ² 9.8 ga/1000ft ²	50 fl. oz./ 1000ft ²	Rate for tough perennial weeds such as: creeping buttercup and broad-leaved plantain.	6340 ft ² /2.5 G jug

Shake well before using. Mix one part Fiesta Turf Weed Killer with 24 parts water (5 oz. in 1 gallon of water). Apply the mixed solution at a rate of 2.5 - 10 gallons/1000 ft² (2.8-11.5 fluid oz./yard²), using the chart to determine how much diluted spray to use per area. Any standard hand-held or backpack sprayer can be used. Thoroughly spray weeds. Use a coarse nozzle setting to reduce drift. Uniform coverage is important.

Repeat treatment in 3 to 4 weeks for best results.

Application Directions – Spot Treatment

Shake well before using. Mix one part Fiesta Turf Weed Killer with 24 parts water (5 oz. in 1 gallon of water). Thoroughly spray weeds to point of runoff using any standard hand-held or backpack sprayer. Use a coarse nozzle setting to reduce drift.

Repeat treatment in 3 to 4 weeks for best results.

What will I see?

Works quickly; dying weeds will be seen within hours of application. Treated weeds, moss or algae will turn brown or black. Occasionally a darkening of the grass leaf blades can occur after treatment; however the grass will recover within a few days to weeks.

- Best results are obtained when applied in the Spring or Fall when environmental conditions are cool and there is ample moisture
- The best times to treat weeds are in the Spring when they are small and growing and in the Fall to eliminate many of next year's weeds
- People and pets can enter treated area when spray dries

NOTICE TO BUYER

Seller warrants that this product conforms to the chemical description on this label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks described above, when used in accordance with the Directions for Use under normal conditions. To the extent consistent with applicable law, this warranty does not extend to use of this product contrary to label directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to Seller. To the extent consistent with applicable law, the Seller shall not be liable for any such use. To the extent consistent with applicable law, the Seller makes no other warranties, either expressed or implied.

For Chemical Emergency
Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada: 1-800-424-9300

For product use or customer service inquiries, call 928-445-7990

V. HEALTH HAZARD DATA

LD ₅₀ (oral) NAV (rat) > 5000mg/kg	LD ₅₀ (dermal) > 5000mg/kg	
Carcinogen or Potential Carcinogen	NTP: no	IARC: no OSHA: no
Routes of Entry:		
Skin:	Slight irritant	
Eyes:	causes slight irritation (reversible)	
Ingestion:	May cause cramps or nausea	
Inhalation:	Slight irritant	
Medical Conditions Aggravated:		

VI. EMERGENCY FIRST AID PROCEDURES

Skin:	Wash thoroughly with soap and water
Eyes:	Flush eyes with plenty of water, consult a physician immediately.
Ingestion:	Do not induce vomiting. Give water for dilution effect and contact a physician.
Inhalation:	Move to fresh air.

VII. SPECIAL PROTECTION INFORMATION

Ventilation:	Adequate ventilation for aerosol should be provided.
Respiratory Protection:	None required
Eye Protection:	Chemical safety goggles.
Protective Gloves:	Impervious gloves

VIII. SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Storage Recommendations:	Store at ambient temperatures.
Spill or Leak Procedures:	Absorb large spills with absorbent materials
Disposal Recommendations:	Dispose of in accordance with local regulations.

IX. TRANSPORTATION INFORMATION

DOT Classification:	Not regulated by US DOT Highway regulations.
U.S. Surface Freight Classification:	(NMFC item 155050, LTL Class: 70 Herbicide) or (NMFC item 50320 Sub 2, LTL Class 60)
UN Number:	Non Hazardous. Not regulated
IMDG Class (sea):	Non Hazardous. Not regulated
IATA Class (air):	Non Hazardous. Not regulated
Marine Pollutant:	No
Packing Group:	Not regulated
Hazard Label(s):	Non Hazardous. Not regulated
ADR Class (road):	Not regulated
Proper Shipping Name(s):	Not regulated
Reportable Quantity:	None
