

70506-43

5/18/2010

1/34



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY  
AND POLLUTION PREVENTION

Ms Rebecca A. Clemmer  
Unites Phosphorus, Inc  
630 Freedom Business Center, Suite 402  
King of Prussia, PA 19406

MAY 18 2010

Subject: Label Notification(s) for Pesticide Registration Notice 2007-4

Dear Registrant:

The Agency is in receipt of your Application(s) for Pesticide Notification under Pesticide Registration Notice (PRN) 2007-4 dated April 20, 2010 for:

**EPA Registration 70506-43      Surflan AS Agricultural**

The Registration Division (RD) has conducted a review of this request for applicability under PRN 2007-4 and finds that the label change(s) requested falls within the scope of PRN-2007-4. The label has been date-stamped "Notification" and will be placed in our records.

Please be reminded that 40 CFR Part 156.140(a)(4) requires that a batch code, lot number, or other code identifying the batch of the pesticide distributed and sold be placed on nonrefillable containers. The code may appear either on the label (and can be added by non-notification/PR Notice 98-10) or durably marked on the container itself.

If you have any questions, please contact me directly at 703-305-6249 or Banza Djapao of my staff at 703-305-7269.

Sincerely,

Linda Arrington  
Notifications & Minor Formulations Team Leader  
Registration Division (7505P)  
Office of Pesticide Programs





# United Phosphorus, Inc.

630 Freedom Business Center  
Suite 402  
King of Prussia, PA 19406  
(610) 491-2828 (phone)  
(610) 491-2810 (fax)

Rebecca A. Clemmer  
Regulatory Manager

April 20, 2010

Document Processing Desk (NOTIF)  
Office of Pesticide Programs (7504P)  
U.S. Environmental Protection Agency  
Ariel Rios Building  
1200 Pennsylvania Ave., N.W.  
Washington, D.C., 20460

Re: Notifications Under PR Notice 2007-4

To Whom It May Concern:

United Phosphorus, Inc. is submitting revised labels to address the requirements of PR Notice 2007-4 for the following products:

Surflan AS Agricultural – EPA Reg. No. 70506-43  
Surflan AS Specialty – EPA Reg. No. 70506-45 44 *bx*

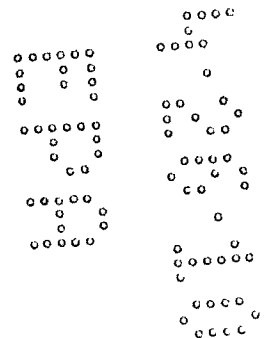
In support, enclosed please find for each:

- EPA form 8570-1
- Label copy marked to show changes

Please contact me if you have any questions.

Very truly yours,

Rebecca A. Clemmer  
[rebecca.clemmer@uniphos.com](mailto:rebecca.clemmer@uniphos.com)



GROUP 3 HERBICIDE

# Surflan<sup>®</sup> A.S. Herbicide

A preemergence surface-applied herbicide for the control of many annual grasses and certain broadleaf weeds in crops, ornamentals, turf, Christmas tree plantations, non-cropland industrial sites, and established trees grown for pulp.

Active Ingredient:

oryzalin: 3,5-dinitro- N <sup>4</sup> , N <sup>4</sup> -dipropylsulfanilamide .....	40.4%
<u>Other Ingredients .....</u>	<u>59.6%</u>
<u>Total .....</u>	<u>100.0%</u>

**NOTIFICATION**

**MAY 18 2010**

Contains four pounds of active ingredient per gallon.

**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. You may also contact the Rocky Mountain Poison Control Center at 1-866-673-6671 for emergency medical treatment.

For chemical emergency: spill, leak, fire, exposure, or accident, call CHEMTREC 1-800-424-9300.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

**Shake Well Before Using.**

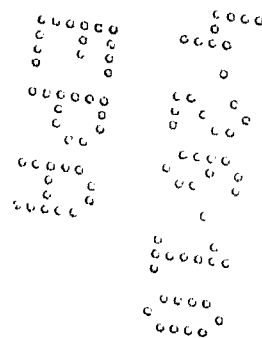
EPA Reg. No. 70506-43  
EPA Est. No.



**UPI**

United Phosphorus, Inc.  
630 Freedom Business Center  
King of Prussia, PA 19406  
1-800-438-6071 • [www.upi-usa.com](http://www.upi-usa.com)

**Net Contents:**



<b>Table of Contents</b>	<b>Page</b>
<b>Precautionary Statements</b>	
Hazards to Humans and Domestic Animals	
Personal Protective Equipment (PPE)	
User Safety Recommendations	
First Aid	
Environmental Hazards	
<b>Directions for Use</b>	
Agricultural Use Requirements	
Non-Agricultural Use Requirements	
Storage and Disposal	
<b>General Information</b>	
General Use Precautions and Restrictions	
Weeds and Grasses Controlled/Suppressed	
<b>Crops -Specific Use Directions</b>	
Tree and Vine Crops - Citrus, Fruit and Nut Trees, Berries and Vineyards (Non Bearing and Bearing)	
Mixing Directions	
Testing for Compatibility in Liquid Fertilizers	
Application Methods	
Ground Broadcast	
Band	
Chemigation	
<b>Ornamental Plantings and Turf Grass - Specific Use Directions</b>	
Tank Mix Combinations	
Trees	
Shrubs	
Groundcovers/Perennials	
Flowers	
Non-Bearing Trees and Vines	
Ornamental Bulbs	
Shadehouse Areas	
Warm Season Turfgrasses	
<b>Other Uses – Specific Use Directions</b>	
Christmas Tree Plantations	
Established Trees Grown for Pulp	
Noncropland Areas and Industrial Sites	
<b>Conditions of Sale &amp; Limitation of Warranty and Liability</b>	

---

**Precautionary Statements**

---

**Hazards to Humans and Domestic Animals****CAUTION**

Causes moderate eye irritation. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Avoid contact with eyes or clothing.

**Personal Protective Equipment (PPE)**

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves
- Shoes plus socks
- Mixers and loaders must wear a chemical-resistant apron in addition to other PPE.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

**Engineering Controls Statements**

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

**User Safety Recommendations**

Users should:

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

**Environmental Hazards**

This pesticide is toxic to fish. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. Cover or incorporate spills.

---

**Directions for Use**

---

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

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

**Agricultural Use Requirements**

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and

exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 24 hours. **Exception:** If the product is soil-injected or soil incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

Workers may enter treated areas without required PPE during the reentry interval following 1/2 to 1 inch of rainfall or irrigation, if they are performing tasks that do not involve contact with the soil subsurface; otherwise, PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves
- Shoes plus socks

### Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for Agricultural Pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

**Entry Restrictions for Non-WPS Uses:** Keep all persons, children and pets out of treated area until sprays have dried.

### Storage and Disposal

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

**Pesticide Storage:** Store in original container only. In case of leak or spill, use absorbent materials to contain liquids and dispose of as waste.

**Pesticide Disposal:** Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility.

**Container Disposal:** Nonrefillable container. Do not reuse or refill this container. Clean container promptly after emptying.

*[for containers less than or equal to 5 gallons]* 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.

*[for containers greater than 5 gallons]* Triple rinse or pressure rinse as follows:

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

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

*[all sizes]* Offer for recycling if available, or puncture and dispose of in a sanitary landfill or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

## General Information

Surflan A.S. herbicide is a preemergence, surface applied herbicide for the control of many annual grasses and certain broadleaf weeds. Surflan A.S. controls susceptible annual weeds by disrupting plant growth processes during germination. Surflan A.S. may be applied in liquid sprays of water or liquid fertilizer, and may be tank mixed with other herbicides to control existing vegetation or improve the spectrum of weeds controlled. Surflan A.S. alone does not control established weeds.

Crop uses: citrus fruits, fruit and nut trees, berries, vineyards (bearing and non-bearing)

Ornamental uses: ornamentals (trees, shrubs, groundcovers/perennials, flowers, nonbearing trees and vines), ornamental bulbs, turf grasses

Other uses: Christmas tree plantations, established trees grown for pulp, noncropland areas and industrial sites.

Surflan A.S. is orange in color and may cause temporary discoloration of sprayed surfaces. If this discoloration is undesirable, it may be altered by using a commercially available colorant such as Blazon or removed by spraying surface with water or washing with an industrial cleaner immediately after application. Surflan A.S. may also be applied with colorants, such as Mulch Magic or Nu-Mulch.

Surflan A.S. may be applied before or after transplanting of the crop. If applied prior to transplanting: (1) disturbance of surface soil should be minimized to prevent loss of weed control; and (2) exposure of the roots of transplants to treated soil should be minimized to avoid any possibility of crop injury.

### General Use Precautions and Restrictions

- Do not graze or feed forage from treated areas to livestock.
- Poor weed control may result if directions are not carefully followed.
- Do not over-apply Surflan A.S. Over-application may result in crop injury.
- Do not plant any root crop for 12 months following a Surflan A.S. application.
- Do not use Surflan A.S. on soils containing more than 5% organic matter.
- Apply Surflan A.S. directly to the soil surface in orchards or vineyards.
- For orchard crops, including citrus, pome fruits, stone fruits, and tree nuts, apply product only as a strip treatment in the tree rows; do not apply to row middles or drive rows.
- Carefully follow label directions to avoid poor weed control or crop injury.
- **Chemigation:** See instructions for chemigation in "Application Methods".
- Do not aerially apply this product.

**Precaution:** Avoid spray drift to non-target areas when applying Surflan A.S. Spray drift may result in reduced emergence of non-target plants adjacent to the treated area. Poor weed control may result if directions are not followed. Over-application may result in crop injury and in residues that exceed tolerance regulations, or in excessive soil residue that may be injurious to rotational crops.

**Rotation Crop Interval:** To avoid crop injury, a 24 month rotational interval is recommended when rotating from tree and vine crops to row crops.

### Weeds and Grasses Controlled

#### Annual Grasses

Common Name	Scientific Name
barley, little	<i>Hordeum pusillum</i>
barnyardgrass (watergrass)	<i>Echinochloa crus-galli</i>
bluegrass, annual (poa)	<i>Poa annua</i>



brachiaria (signalgrass)	<i>Brachiaria</i> spp.
crabgrass	<i>Digitaria</i> spp.
(large crabgrass)	
(smooth crabgrass)	
crowfootgrass	<i>Dactyloctenium aegyptium</i>
cupgrass	<i>Eriochloa gracilis</i>
downy brome	<i>Bromus tectorum</i>
foxtails	<i>Setaria</i> spp.
(bottlegrass)	
(bristlegrass)	
(giant foxtail)	
(green foxtail)	
(pigeongrass)	
(robust foxtail)	
(yellow foxtail)	
guineagrass	<i>Panicum maximum</i>
(narrowleaf panicum)	
Goosegrass (silver crabgrass)	<i>Eleusine indica</i>
johnsongrass (seedling only)	<i>Sorghum halepense</i>
jungerice	<i>Echinochloa colonum</i>
lovegrass, Mexican	<i>Eragrostis mexicana</i>
lovegrass, orcutt	<i>Eragrostis orcuttiana</i>
oat, wild	<i>Avena fatua</i>
panicum, browntop	<i>Panicum fasciculatum</i>
panicum, fall	<i>Panicum dichotomiflorum</i>
(spreading panicgrass)	
panicum, Texas	<i>Panicum texanum</i>
(buffalograss)	
(Coloradograss)	
ryegrass, annual (Italian)	<i>Lolium multiflorum</i>
sandbur, field	<i>Cenchrus incertus</i>
sprangletop, red	<i>Leptochloa filiformis</i>
witchgrass	<i>Panicum capillare</i>

**Annual Broadleaf Weeds**

<b>Common Name</b>	<b>Scientific Name</b>
bittercress	<i>Cardamine oligosperma</i>
carpet weed	<i>Mollugo verticillata</i>
chickweed, common	<i>Stellaria media</i>
cutweed	<i>Gnaphalium chilense</i>
fiddleneck, coast	<i>Amsinckia intermedia</i>
filaree, redstem	<i>Erodium cicutarium</i>
filaree, whitestem	<i>Erodium moschatum</i>
Florida pusley	<i>Richardia scabra</i>
(Florida purslane)	
(Mexican clover)	
(pusley)	
groundsel, common	<i>Senecio vulgaris</i>
henbit	<i>Lamium amplexicaule</i>
knotweed, prostrate	<i>Polygonum aviculare</i>
lambquarters	<i>Chenopodium album</i>
pigweeds	<i>Amaranthus</i> spp.
(carelessweed)	
(prostrate pigweed)	
(redroot pigweed)	
(rough pigweed)	

- (smooth pigweed)
- (spiny pigweed)
- (spring pigweed)
- (tumble pigweed)
- puncturevine
- purslane, common
- rocket, London
- rockpurslane, desert
- rockpurslane, redmaids
- shepherdspurse
- spurge, prostrate
- woodsorrel, yellow

- Tribulus terrestris*
- Portulaca oleracea*
- Sisymbrium irio*
- Calandrinia ciliata*
- Calandrinia caulescens*
- Capsella bursa-pastoris*
- Euphorbia humistrata*
- Oxalis stricta*

**Surflan A.S. provides partial control or suppression of:**

- | <b>Common Name</b>     | <b>Scientific Name</b>          |
|------------------------|---------------------------------|
| groundsel, common      | <i>Senecio vulgaris</i>         |
| horseweed              | <i>Conyza canadensis</i>        |
| ladysthumb             | <i>Polygonum persicaria</i>     |
| lettuce, prickly       | <i>Lactuca serriola</i>         |
| mallow, common         | <i>Malva neglecta</i>           |
| milkweed, climbing     | <i>Sarcostemma cynanchoides</i> |
| morningglory, annual   | <i>Ipomoea</i> spp.             |
| mustard, black         | <i>Brassica nigra</i>           |
| mustard, wild          | <i>Sinapis arvensis</i>         |
| nightshade, black      | <i>Solanum nigrum</i>           |
| prickly sida (teaweed) | <i>Sida spinosa</i>             |
| ragweed, common        | <i>Ambrosia artemisiifolia</i>  |
| ragweed, giant         | <i>Ambrosia trifida</i>         |
| smartweed, annual      | <i>Polygonum</i> spp.           |
| sowthistle, annual     | <i>Sonchus oleraceus</i>        |
| spurge, spotted        | <i>Euphorbia maculata</i>       |
| teaweed (prickly sida) | <i>Sida spinosa</i>             |
| velvetleaf             | <i>Abutilon theophrasti</i>     |
| wheat, volunteer       | <i>Triticum</i> spp.            |

**Crop-Specific Use Directions**

**Tree and Vine Crops - Citrus, Fruit and Nut Trees, Berries and Vineyards (Non Bearing and Bearing)**

Apply Surflan A.S. as a preemergence treatment to control annual grasses and broadleaf weeds listed in "General Information" section. Observe all precautions and restrictions in the "General Information" section.

**Crop Listing:** Surflan A.S. may be applied to crops listed under the following crop groupings:

<b>Citrus Fruits</b>	<b>Pome and Stone Fruits</b>	<b>Tree Nuts</b>	<b>Berries</b>	<b>Vineyards</b>
citrus citron citrus hybrids grapefruit kumquat	apple apricot cherry crabapple loquat	almond chestnut chinquapin filbert hickory nut	blackberry blueberry <sup>†</sup> boysenberry currant dewberry	grapes

11  
34

lime lemon mandarin (tangerine) orange pummelo	mayhaw nectarine peach pear plum prune quince	macadamia nut pecan pistachio walnut	elderberry gooseberry loganberry raspberry	
---	---	---	---	--

†Do not apply Surflan A.S. to lowbush blueberries.

In addition to the crops within crop groupings listed above, Surflan A.S. may be used in the following crops: avocado, fig, guava, kiwi fruit, olive, papaya, and pomegranate

**Soil Preparation**

Surflan A.S. controls weeds growing from seed. Surflan A.S. will not control emerged weeds. Surflan A.S. does not control established weeds, weeds growing from stolens, rhizomes, or root pieces. Therefore, areas to be treated should be free of emerged weeds. Weed residues, prunings, and trash should be thoroughly mixed into the soil or removed prior to treatment. In field applications, the soil should be in good tilth and free of clods at the time of application.

**Broadcast Application Rates**

Soil Texture	Length of Control	Surflan A.S. (qt/acre)	Minimum Time Between Applications (months)	Total Amount Allowed Per Year (qt/acre)
All Soil Textures	Short Term (2 - 4 months)	2	2.5	12
	Long Term (6 - 8 months)	4	2.5	12
	(8 - 12 months)	6	2.5	12

**Activation and Cultivation**

A single 1/2 to 1 inch rainfall or sprinkler irrigation is required to activate Surflan A.S. and move the herbicide into the zone of weed germination. Rainfall or irrigation of 1 inch or more is needed to activate Surflan A.S. on fine-textured, high organic matter soils. If weeds begin to emerge, a shallow cultivation to a depth of 1 to 2 inches will destroy existing weeds and place Surflan A.S. in the zone of weed germination.

**Mixing Directions**

**Surflan A.S. – Alone**

Surflan A.S. may be applied in water or most liquid fertilizer materials. Prior to mixing Surflan A.S. in liquid fertilizer, refer to "Testing for Compatibility in Liquid Fertilizers" for test procedures to determine compatibility with the fertilizer product to be used. The combination of Surflan A.S. with solution and suspension-type fertilizers provides annual weed control equal to Surflan A.S. applied in water. Individual state regulations relating to liquid fertilizer mixing, registration, labeling and application are the responsibility of the individual and/or company offering the fertilizer and chemical mixture for sale.

Start with a clean spray tank. Fill the sprayer to 1/3 to 1/2 of the required spray volume. Start agitation. Shake the container well and add the correct amount of Surflan A.S., continue agitation and fill spray tank to required spray volume. Maintain continuous agitation from mixing through application.

**Precaution:** Do not allow the mixture to siphon back into the water source.

**Surflan A.S. in Tank Mix**

Vigorous, continuous agitation during mixing, filling and throughout application is required for all tank mixes. Sparger pipe agitators generally provide the most effective agitation in spray tanks. To prevent foaming in the spray tank, avoid stirring or splashing air into the spray mixture.

Surflan A.S. may be tank mixed with label rates of other products and applied with water or most liquid fertilizer materials, provided (1) the tank mix product is labeled for the timing and method of application for the use site to be treated; (2) tank mixing is not prohibited by the label of the tank mix product; and (3) A (jar) test is performed to ensure the compatibility of products to be used in tank mixture.

**Surflan A.S. Tank Mix Recommendations:**

To broaden the spectrum of weed control, Surflan A.S. may be applied in tank mix combination with labeled rates of other herbicide products, including, but not limited to Goal, Gramoxone, Princep (Simazine), glyphosate, or Solicam herbicide. Performance and risk of carryover from tank mixed products used in combination with Surflan A.S. at recommended rates is the same as when each product is used separately.

**Tank Mixing Precautions:**

- Read carefully and follow all applicable use directions, precautions, and limitations on the respective product labels.
- Do not exceed recommended application rates.
- For products packaged in water soluble packaging, do not tank mix with products containing boron or mix in equipment previously used to apply a product mixture containing boron unless the tank and spray equipment has been thoroughly cleaned.

**Tank Mix Compatibility Testing:** A jar test is recommended prior to tank mixing to ensure compatibility of Surflan A.S. and other products. Use a clear glass quart jar with lid and mix the tank mix ingredients in their relative proportions. Invert the jar containing the mixture several times and observe the mixture for approximately 1/2 hour. If the mixture balls-up, forms flakes, sludges, gels, oily films or layers, or other precipitates, it is not compatible and the tank mix combination should not be used.

**Mixing Order (Tank Mixing with Water):** Fill the spray tank to 1/4 to 1/3 of the total spray volume. Start agitation. Add different formulation types in the following order, allowing time for complete mixing and dispersion after addition of each product (allow extra mixing and dispersion time for dry flowable products):

1. Add dry flowables; wettable powders; Surflan A.S. or other aqueous suspensions, flowables and water-based solutions.
2. Maintain agitation and fill spray tank to 3/4 of total spray volume. Then add any emulsifiable concentrates.

Finish filling the spray tank. Maintain continuous agitation during mixing, final filling and throughout application. If spraying and agitation must be stopped before the spray tank is empty, the materials may settle to the bottom. Settled materials must be resuspended before spraying is resumed. A sparger agitator is particularly useful for this purpose. Settled material may be more difficult to resuspend than when originally mixed.

**Tank Mixing with Liquid Fertilizer:** Prior to mixing Surflan A.S. with other products in liquid fertilizer, refer to the tank mix product manufacturer's label to determine if application in liquid fertilizer is recommended. Also refer to "Testing for Compatibility in Liquid Fertilizers" for testing procedures to determine tank mix compatibility with the liquid fertilizer product to be used. The combination of Surflan A.S. with solution and suspension-type fertilizers provides annual weed control equal to Surflan A.S. applied in water. Individual state regulations relating to liquid fertilizer mixing, registration, labeling and application are the responsibility of the individual and/or company offering the fertilizer and chemical mixture for sale. Read and follow all label instructions for each material to be added to the spray tank.

Vigorous continuous agitation is required for all tank mixes. Sparger pipe agitators generally provide the best agitation in spray tank. To prevent foaming, keep the end of the fill pipe below the surface of the water in the spray tank during filling to prevent air from being stirred or splashed into the mixture.

**Mixing Order (Tank Mixing With Liquid Fertilizer):** Fill the spray tank to 3/4 of the total spray volume required. Start agitation. Add different formulation types in the following order, allowing time for complete mixing and dispersion after addition of each product. (Allow extra mixing and dispersion time for dry flowable products):

Dry flowables; wettable powders; Surflan A.S. or other aqueous suspensions, flowables, water-based solutions, and any emulsifiable concentrates.

Finish filling spray tank. Maintain continuous agitation during mixing, final filling and throughout application. If spraying and agitation must be stopped before the spray tank is empty, the materials may settle to the bottom. Settled materials must be suspended before spraying is resumed. A sparger agitator is particularly useful for this purpose. Settled materials may be more difficult to resuspend than when originally mixed.

**Premixing:** When tank mixing, initial mixing and dispersion of certain dry flowable or wettable powder products may be improved by premixing with water (slurrying). Where recommended, follow product label instructions for each material. Adding the slurried material to the spray tank through a 20 to 35 mesh wetting screen will help assure good initial dispersion. Line screens in the tank should be no finer than 50 mesh (100 mesh is finer than 50 mesh).

### Testing for Compatibility in Liquid Fertilizers

Surflan A.S. alone or in combination with dry flowable (DF), wettable powder (WP), aqueous suspension (AS), flowable (F), liquid (L), solution (S) or emulsifiable concentrate (EC) formulations may not combine properly with some liquid fertilizer materials. Small quantities of such mixtures should **always** be tested before full-scale mixing. Follow the testing procedure below to determine if a compatibility agent is needed or which compatibility agent works best in your liquid fertilizer plus herbicide mixture.

#### Testing Procedure

1. Add 1 pint of liquid fertilizer to 1-quart glass jar.
2. Add 1 to 4 teaspoonfuls of DF, WP, Surflan A.S., other AS formulations, F, or L formulations, depending on mixing ratio required, to the liquid fertilizer. Close the jar and shake until evenly dispersed after addition of each formulation. If dry flowable or wettable powder formulations do not disperse well, it may be necessary to slurry the materials in a small amount of water before addition to the liquid fertilizer.
3. After dispersing the materials in step 2, add any S formulations to the jar and shake well. Finally, add EC formulations to the mixture and shake well. Observe the jar for about 10 minutes. If materials rise to the surface and form a thick layer that will not redispense when agitated, a compatibility agent is needed. If the mixture is easily redispersed with slight agitation, a compatibility agent is not required. Good agitation, however, must be provided to maintain dispersion in the spray tank from mixing through application.
4. If the need for a compatibility agent is demonstrated in step 3, the following procedure is recommended: Using a clean clear plastic or glass container, repeat step 1 above and add 1/2 teaspoon of the compatibility agent to the liquid fertilizer mixture. Shake well and then repeat steps 2 and 3.

An effective compatibility agent will cause the mixture to remain uniformly mixed with little or no separation for 1/2 hour or longer. If slight separation occurs, 2 to 3 inversions of container should be sufficient to uniformly redispense the mixture. If layers form which will not disperse, try adding additional compatibility agent or use an alternative compatibility agent to achieve a uniform mixture.

Use a clean jar in each test. A compatible mixture will have a uniform appearance and will be relatively easy to redisperse with gentle agitation of the jar.

**Compatibility Agents**

Use a phosphate ester-type surfactant designed for use with liquid fertilizers mixed at rates as low as 1 1/2 to 2 pints per ton of liquid fertilizer. This type of surfactant usually doesn't work well as compatibility agent for tank mixes in plain water. Add the compatibility agent just before adding herbicides. Read and follow label directions for the compatibility agent.

**Application Methods**

**Ground Broadcast Application**

Apply Surflan A.S. directly to the soil surface of the orchard or vineyard in a total spray volume of 20 to 40 gallons per acre (broadcast basis), using any properly calibrated low pressure herbicide sprayer that will apply the spray uniformly. Use herbicide nozzle tips and screens no finer than 50 mesh for nozzle and in-line strainers. As the amount of spray volume per acre decreases, the importance of accurate calibration and uniform application increases. Check the sprayer daily to insure proper calibration and uniform application. Avoid boom overlaps that will increase rates above those recommended.

**Band Application**

For band application, use the following formula to calculate the required amount of product per acre.

$$\frac{\text{Band Width (inches)}}{\text{Row Width (inches)}} \times \text{Broadcast rate per acre} = \text{Amount required per acre}$$

**Chemigation**

Surflan A.S. may be applied through properly equipped chemigation systems for weed control in fruit and nut orchards or vineyards. Read and follow all label instructions outlined below concerning chemigation before applying Surflan A.S. by this method. Apply Surflan A.S. by chemigation prior to weed germination or immediately after existing weeds have been controlled. Control existing unwanted vegetation by tillage or with a contact or translocated herbicide. Use broadcast application rates recommended for Surflan A.S. alone. Apply in sprinkler irrigation equal to 1/2 to 1 inch of water on medium to fine textured or high organic matter soils.

**Chemigation Use Precautions:** Apply this product only through solid set or hand move systems designed to distribute sprinkler irrigation beneath the tree canopy. Solid set systems utilizing tall risers for overhead application are excluded, except for dormant season applications of Surflan A.S. Do not apply this product through any other type of irrigation system.

Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from nonuniform distribution of treated water.

If you have questions about calibration you should contact state extension specialists, equipment manufacturers or other experts.

Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system.

A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

**Sprinkler Chemigation Directions:** The following directions must be followed for all recommended sprinkler irrigation systems (solid set and hand move systems):

1. The system must contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from back-flow.
2. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
3. The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
4. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
5. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point that pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.
8. Surflan A.S. should be injected continuously throughout the chemigation period. The chemigation metering pump should be checked periodically during application to insure proper operation.
9. The injection metering pump must be calibrated as specified by the manufacturer.
10. During chemigation, maintain agitation in supply tank at all times.
11. Surflan A.S. may cause some staining of plastic hoses and tanks.
12. Apply Surflan A.S. in sprinkler irrigation equal to 1/2 to 1 inch of water.

**Chemigation System Calibration:** Sample calculation for use of Surflan A.S. in a chemigation system:

- Assume, in this example, 35 acres are to be covered by a chemigation treatment.
- Product required, assuming 1 quart per acre is 35 quarts (8.75 gallons).
- Prepare a mixture containing 1 part water and 1 part Surflan A.S. by adding 8.75 gallons of product to the supply tank containing an equal amount of water (total volume = 17.5 gallons).
- Adjust the injection system to deliver 17.5 gallons during the time required to apply 1 inch of water to 35 acres.
- If the irrigation system requires 5 hours to apply 1 inch of water to 35 acres, the injection rate is 3.5 gallons per hour and is calculated as follows:  

$$17.5 \text{ gallons} / 5 \text{ hours} = 3.5 \text{ gallons/hour}$$

$$[3.5 \text{ gallons} = 448 \text{ fluid ounces (fl oz)}]$$

Proper calibration requires the injection pump to be adjusted to deliver 7.47 fl oz per minute and is calculated as follows:

$$448 \text{ fl oz per hr} / 60 \text{ min per hr} = 7.47 \text{ fl oz/min.}$$

**Chemigation Mixing Directions:** The injection mixture (slurry) with minimum volume may be prepared by adding the required amount of Surflan A.S. to an equal amount of water in the injection tank (ratio Surflan A.S. to water = 1:1). Meter the mixture into the irrigation system during the entire irrigation period. Additional dilution of Surflan A.S. may be necessary for accurate calibration of equipment designed to deliver a larger injection volume per hour. Maintain supply tank agitation throughout the irrigation period.

Undiluted Surflan A.S. should not be injected into chemigation systems.

**Non-Bearing Tree and Vine Crops:** For additional broad spectrum control of broadleaf weeds in non-bearing fruit and nut trees, berries, and vineyards, Surflan A.S. may be applied in tank mix combination with labeled rates of Gallery<sup>®</sup> 75 Dry Flowable herbicide. Non-bearing crops are defined as plants that will not bear fruit for at least one year after treatment.

Follow tank mixing instructions in the "Mixing Directions" section of this label when mixing Surflan A.S. with other products.

Applicators must follow the label for the product(s) to be tank mixed with Surflan A.S. for specific information on use rates, additional weeds controlled, rotational crop restrictions or risk of carryover, special tank mix instructions, additional use directions, precautions and limitations.

---

### Specific Use Directions – Ornamental Plantings and Turf Grass

---

#### Ornamental Plantings

Surflan A.S. is recommended for use on certain landscape container- and field-grown established ornamental plants including: trees, shrubs, ground covers/perennials, flowers, non-bearing fruit and nut trees, non-bearing vineyards; and in the production of ornamental bulbs (See "Ornamental Bulbs" section for special use directions). Apply Surflan A.S. as a preemergence treatment to control annual grasses and broadleaf weeds listed in "General Information" section. Follow all precautions and restrictions in the "General Information" section.

Do not apply through any type of irrigation system for use on ornamentals.

#### Treatment of Plant Species Not Listed on the Label for Surflan A.S.

Users who wish to use Surflan A.S. on plant species not recommended on this label may determine the suitability for use by treating a small number of such plants at a recommended rate. Prior to treatment of larger areas, the treated plants should be observed for any sign of herbicidal injury during 30-60 days of normal growing conditions to determine if the treatment is non-injurious to the target plant species. The user assumes responsibility for any plant damage or other liability resulting from use of Surflan A.S. on plant species not recommended on this label.

#### Application

##### Soil Preparation

Surflan A.S. controls weeds growing from seed. Surflan A.S. will not control emerged weeds. Surflan A.S. does not control established weeds, weeds growing from stolens, rhizomes, or root pieces. Therefore, areas to be treated should be free of emerged weeds. Weed residues, prunings, and trash should be thoroughly mixed into the soil or removed prior to treatment. In field applications, the soil should be in good tilth and free of clods at the time of application.

**Ground Application:** Apply Surflan A.S. as a directed spray to the soil surface or over the top of plants. Use only a properly calibrated, low-pressure, herbicide sprayer that will apply the spray uniformly. Use screens no finer than 50 mesh in nozzles and in-line strainers. Apply the appropriate rate of Surflan A.S., as outlined in "Crop Specific Use Directions" section of this label. In all cases, use sufficient water volume to obtain uniform coverage and deliver the desired rate of Surflan A.S. to the treated area. The volume of water used is not critical, as long as the desired rate of Surflan A.S. is delivered uniformly across the area treated. When calibrating, determine the volume of water delivered by the sprayer to a given area (1,000 sq ft, 1 acre, etc.). Then mix the desired rate of Surflan A.S. in the amount of water required to cover the entire area to be treated. As the amount of water used (spray volume) decreases, the importance of accurate calibration and uniform application increases. Check the sprayer daily to ensure proper calibration and uniform application. Maintain continuous agitation from mixing through application. Avoid spray pattern skips and overlaps that may result in incomplete coverage or over-application.



**Hand Held or Backpack Sprayer Application:** The amount of water used to apply Surflan A.S. herbicide is not critical, but should be sufficient for uniform coverage of the target area. Calibrate by determining the volume of water required to treat 1000 square feet. Use this calibration volume to determine the amount of water and Surflan A.S. herbicide needed to treat the target area (see the following calibration example).

**Note:** Sprayer calibration (volume of spray needed to treat 1,000 square feet) will vary with each individual operator.

**Steps in Calibration:**

1. Mark an area of 1,000 square feet (i.e. 20 by 50 feet, or 25 by 40 feet).
2. Place the sprayer on a level surface and add water noting the final level of water in the spray tank.
3. Spray the marked area with a sufficient volume of water to provide uniform coverage. Refill the sprayer to the same level as before measuring the amount of water added. The measured water added to the sprayer is the volume needed to cover 1,000 square feet.
4. Determine the application rate (fl oz/1000 sq ft) for Surflan A.S. from the "Crop Specific Use Directions" section of this label.
5. To each volume of water used, as measured in step 3, add the amount of Surflan A.S. as determined in step 4.

**Example:** If the sprayer used 2 gallons of water to cover 1,000 square feet and the desired application rate of Surflan A.S. is 3 fluid oz/1,000 square feet, then you would add 3 fluid ounces of Surflan A.S. to every 2 gallons of water to be used.

**Mixing Directions**

**Precaution:** Do not allow the spray mixture to siphon back into water source.

**Surflan A.S. - Alone**

Make sure spray tank is clean and use only clean water. Fill spray tank 1/2 - 3/4 full. Start agitation and add the required amount of Surflan A.S.. Continue agitation and finish filling the spray tank. Maintain continuous agitation until application is completed.

**Surflan A.S. - Tank Mix Combinations**

Read and carefully follow all label instructions and precautions for each product added to make a tank mixture. Vigorous, continuous agitation is required for all tank mixes of Surflan A.S.. Sparger pipe agitators generally provide the best agitation in spray tanks.

**Mixing Order:** Fill the tank 3/4 full with clean water. Start agitation and add different formulation types in the order indicated below, allowing time for complete mixing and dispersion after addition of each product. Allow extra mixing and dispersion time for dry flowable products.

Add different formulation types in the following order: dry flowables (DF); wettable powders (WP); Surflan A.S. and other aqueous suspensions (AS), flowables (F), and liquids (L); solutions (S); and emulsifiable concentrates (EC).

Continue agitation and finish filling the spray tank with clean water. Maintain agitation until application is completed. If spraying and agitation must be stopped before the spray tank is empty, the materials may settle to the bottom. Settled materials must be completely resuspended before spraying is continued. A sparger agitator is particularly useful for this purpose.

**Premixing:** When tank mixing, initial mixing and dispersion of certain dry flowable or wettable powder products may be improved by premixing with water (slurrying). Adding the slurried material to the spray tank through a wetting screen of 20 or 35 mesh will help assure good initial dispersion.

**Equipment Cleaning**

If a buildup of material occurs on the walls of the spray tank, it should be removed between fillings by washing with soap and water and rinsing thoroughly. Tanks, lines, screens, and nozzles should be cleaned thoroughly after each use.

**Activation and Cultivation**

Surflan A.S. will remain stable on the soil surface up to 21 days following application. In the absence of timely rainfall, irrigation can be used to activate Surflan A.S. A minimum of one-half (1/2) inch of rain or its equivalent in sprinkler irrigation is necessary to activate Surflan A.S. If weeds begin to emerge due to lack of rainfall or irrigation, shallow cultivate 1-2 inches deep to destroy existing weeds, or remove them by hand. Shallow cultivation to a depth of 1-2 inches will enhance herbicidal effectiveness. Erratic weed control may result if Surflan A.S. is not activated by rainfall, irrigation, or cultivation within 21 days of application, or existing weeds have not been removed.

**Broadcast Application Rates**

Labeled Use Site	Length of Control	Surflan A.S.		Minimum Time Between Applications (months)	Total Amount Allowed Per Year (qt/acre)
		(qt/acre)	(fl oz/1000 sq ft)		
Landscape Ornamentals	2 - 4 months	2	1.5	2	8
	3 - 6 months	3	2.2	4	12
	4 - 8 months	4	3	4	12
Field-grown and container-grown ornamentals	2 - 4 months	2	1.5	3	8
	3 - 6 months	3	2.2	3	9
	4 - 8 months	4	3	3	12

**Tank Mix Combinations**

Tank mix combinations of Surflan A.S. plus glyphosate, and many other labeled herbicides may be used to control undesirable vegetation in ornamental areas. Surflan A.S. may also be tank mixed with Gallery<sup>®</sup> herbicide and applied preemergence to broaden the spectrum of broadleaf weed control in ornamental areas. Applied as directed, these tank mixes of Surflan A.S. will provide control of susceptible weed species listed on the respective labels. Refer to tank mix product labels for specific use directions, precautions, and limitations before use.

**Surflan A.S. Plus glyphosate:** Tank mix combinations of Surflan A.S. plus glyphosate are recommended to control existing undesirable vegetation. Applied as directed, Surflan A.S. plus glyphosate will provide postemergence control of susceptible weed species listed on the label for glyphosate and residual preemergence control of susceptible weed species listed on the label for Surflan A.S. Refer to the label for glyphosate for specific use directions, precautions, and limitations before use.

**Precautions:** Do not apply sprays containing glyphosate over the top of ornamental plants. Extreme care must be exercised to prevent sprays containing glyphosate from coming in contact with foliage and stems of turfgrasses, trees, shrubs, or other desirable vegetation because severe damage or death may result. If spraying with glyphosate in areas adjacent to desirable plants, use a shield to prevent spray from contacting foliage and stems of desirable plants.

**Special Use Precautions:**

Apply only to established plants that have been transplanted into their growing location for a sufficient period of time to allow the soil to be firmly settled around the roots from packing and rainfall or irrigation.

Rooted liners should be removed from their original growing containers and placed in new containers at least two weeks prior to treatment or injury may occur.

To avoid possible injury, do not apply Surflan A.S. to:

- Nursery, forest, or Christmas tree: seedling beds, cutting beds, or transplant beds.
- Unrooted liners or cuttings that have been planted in pots for the first time.
- Pots less than four inches wide.
- Ground covers until they are established and well rooted.
- Ornamental plantings where there is likelihood of runoff onto lawn areas.
- Areas containing dichondra or cool season turfgrass species.

On container grown ornamentals where weed seed germination continues for extended periods of time, do not make repeat applications of Surflan A.S. for at least 90 days or crop injury may occur.

Applications of Surflan A.S. over the top of plants with newly forming buds may cause injury. In this situation a directed spray is recommended.

For soils treated with Surflan A.S. during the previous season, plant only the ornamental species listed on this label or injury may occur.

**Ice Plant:** When establishing unrooted ice plant on coarse-textured soils in landscape plantings, do not exceed the 2 quart per acre rate of Surflan A.S. or crop injury may occur.

**Note:** Injury on the following plant species has been observed following applications of Surflan A.S. and use is not recommended:

- Deutzia gracilis* (slender deutzia)
- Pseudotsuga menziesii* (Douglas-fir)
- Thuja occidentalis* 'Techny' (Techny arborvitae)
- Tsuga canadensis* (eastern hemlock)
- Begonia* spp. (begonia)
- Coleus hybridus* (coleus)

**Surflan A.S. May be Used on the Following Established Plant Species:**  
(Note: Limitations on culture methods).

**Trees**

**Recommended Culture Methods**

**F = Field Grown**  
**C = Container Grown**

Scientific Name	Common Name	
<i>Abies balsamea</i>	Fir, balsam	F
<i>Abies concolor</i>	Fir, white	F
<i>Abies fraseri</i>	Fir, fraser	F
<i>Abies grandis</i>	Fir, grand	F
<i>Abies veitchi</i>	Fir, Vietch	F
<i>Abies lasiocarpa</i>	Fir, alpine	F
<i>Abutilon hybridum</i>	Albus-flowering maple	F
	Luteus-flowering maple	F
	Roseus-flowering maple	F
	Tangerine-flowering maple	F
	Vesuvius red-flowering maple	F
<i>Acer ginnala</i>	Flame maple	F
<i>Acer rubrum</i>	Red sunset maple	F
<i>Acer saccharinum</i>	Silver maple	F
<i>Acer</i> spp.	Maple	F
<i>Alsophila australis</i>	Australian tree fern	C,F
<i>Areacastrum romanzoffianum</i>	Queen palm	F
<i>Betula nigra</i>	Birch, river	F
<i>Betula papyrifera</i>	Paper birch	F
<i>Betula pendula</i>	Birch, white	F
<i>Bucida buceras</i>	Black olive	F
<i>Carya</i> spp.	Pecan, ornamental	C,F
<i>Cedrus, atlantica</i>	Atlas cedar	C,F
<i>Cedrus deodara</i>	Deodar cedar	C,F
<i>Ceratonia siliqua</i>	Carob	F

Scientific Name	Common Name	
<i>Cercidium floridum</i>	Palo Verde, blue	F
<i>Cercis canadensis</i>	Redbud	C,F
<i>Chamaecyparis lawsoniana</i>	Falsecypress, Lawson	F
<i>Chamaecyparis obtusa</i>	Filicoides-fernspray cypress	F
	Gracilis-slender Hinoki cypress	F
<i>Chamaecyparis pisifera</i>	Sawara-false cypress	F
	Squarrosa-moss cypress	F
<i>Chamaedorea cataractarum</i>	Cat Palm	F
<i>Chamaedorea costaricana</i>	Palm	F
<i>Chamaedorea elegans</i>	Parlor palm	F
<i>Citrus</i> spp.	Citrus, ornamental	C,F
<i>Cornus florida</i>	Dogwood, flowering	F
<i>Cryptomeria japonica</i>	Cryptomeria, Japanese	C,F
<i>Cupaniopsis anacardioides</i>	Carrot wood	F
<i>Cupressus arizonica (glabra)</i>	Cypress, Arizona	C,F
<i>Cupressus glabra</i>	Arizona cypress	C,F
<i>Cupressocyparis leylandii</i>	Leyland cypress	C,F
<i>Cupressus sempervirens</i>	Cypress, Italian	C,F
<i>Dicksonia antarctica</i>	Tasmanian tree fern	C,F
<i>Elaeagnus angustifolia</i>	Russian olive	C,F
<i>Eucalyptus camaldulensis</i>	Red gum eucalyptus	F
<i>Eucalyptus cinerea</i>	Eucalyptus, mealy	F
	Silver dollar eucalyptus	F
<i>Eucalyptus nicholii</i>	Eucalyptus, narrow-leaved	F
<i>Eucalyptus sideroxylon</i>	Eucalyptus, red ironbark	F
<i>Ficus benjamina</i>	Ficus	F
<i>Fraxinus</i> spp.	Ash	F
<i>Ginkgo biloba</i>	Ginkgo (Maidenhair tree)	C,F
<i>Gleditsia triacanthos</i>	Honey locust	F
<i>Heteromeles arbutiflora</i>	Toyon	F
<i>Juniperus virginiana</i>	Redcedar, Eastern	F
<i>Koeleruteria paniculata</i>	Goldenrain tree	F
<i>Liquidambar styraciflua</i>	Sweetgum, American	C,F
<i>Magnolia</i> spp.	Magnolia	F
<i>Malus</i> spp.	Crabapple	F
<i>Morus alba</i>	White mulberry	F
<i>Picea abies</i>	Pendula-weeping Norway spruce	F
	Repens-spreading Norway spruce	F
	Spruce, Norway	F
<i>Picea englemanni</i>	Spruce, Englemann	F
<i>Picea glauca</i>	Spruce, white	F
	Conica-dwarf Alberta spruce	F
<i>Picea glauca conica</i>	Dwarf Alberta spruce	F
<i>Picea mariana</i>	Spruce, black	F
<i>Picea pungens</i>	Glauca-Colorado blue spruce	F
	Hoopsii-Hoop's blue spruce	F
	Koster-Koster blue spruce	F
	Spruce, Colorado	C,F
<i>Pinus aristata</i>	Bristlecone pine	F
<i>Pinus canariensis</i>	Canary Island pine	F
<i>Pinus contorta</i>	Shore pine, beach pine	F
<i>Pinus eldarica</i>	Eldarica pine	F
<i>Pinus halepensis</i>	Aleppo pine	C,F
<i>Pinus radiata</i>	Monterey pine	F

Scientific Name	Common Name	
<i>Pinus</i> spp.	Pine	C,F
<i>Pinus strobus</i>	Eastern white pine	F
<i>Pinus sylvestris</i>	Scotch pine	F
<i>Pinus thunbergiana</i>	Japanese black pine	F
<i>Platanus occidentalis</i>	American sycamore	F
<i>Platanus racemosa</i>	Californina sycamore	F
<i>Podocarpus</i> spp.	Podocarpus	F
<i>Populus deltoides</i>	Cottonwood	F
	Cottonwood (grown for pulp)	F
<i>Prunus caroliniana</i>	Laurelcherry, Carolina	F
<i>Prunus glandulosa</i>	Dwarf flowering almond	C,F
<i>Prunus laurocerasus</i>	Laurelcherry, English	F
<i>Prunus mahaleb</i>	Cherry, Mahaleb	F
<i>Prunus yedoensis</i>	Yoshino flowering cherry	F
<i>Pyrus communis</i>	Pear	F
<i>Quercus palustris</i>	Pin oak	F
<i>Quercus phellos</i>	Willow oak	F
<i>Quercus rubra</i>	Red oak	C,F
<i>Quercus</i> spp.	Oak	C,F
<i>Salix babylonica</i>	Babylon weeping willow	F
	Corkscrew willow	F
<i>Schinus molle</i>	California pepper tree	F
<i>Sequoia sempervirens</i>	Redwood, coast	F
<i>Sequoiadendron giganteum</i>	Giant sequoia	F
<i>Swietenia mahogani</i>	Mahogany	F
<i>Tabebuia caraiba</i>	Yellow tab	F
<i>Tilia cordata</i>	Linden, little leaf	C,F
<i>Ulmus parvifolia</i>	Chinese elm	F
<i>Umbellularia californica</i>	California laurel	F
<i>Washingtonia robusta</i>	Mexican fan palm	F

**Shrubs**

**Recommended Culture Methods**

F = Field Grown  
C = Container Grown

Scientific Name	Common Name	
<i>Abelia grandiflora</i>	Glossy abelia	F
<i>Acacia redolens</i>	Acacia, prostrate	F
<i>Agave americana</i>	Century plant	F
<i>Agave macroculmis</i>	Agave	F
<i>Anisodonteia hypomandarum</i>	Cape mallow	C,F
<i>Arctostaphylos stanfordiana</i>	Manzanita, Stanford	F
<i>Astilbe chinensis</i>	Astilbe/false spirea	C,F
<i>Baccharis pilularis</i>	Coyotebush	F
<i>Berberis thunbergii</i>	Aurea-golden Japanese barberry	C,F
	Crimson pygmy barberry	C,F
	Atropurea-redleaf Japanese barberry	C,F
	Barberry, Japanese	C,F
<i>Bougainvillea</i> spp.	Barbara Karst	F
	California gold	F
	Scarlet O'Hara	F
	Texas dawn	F
<i>Buddleia davidii</i>	Butterfly bush	C,F
<i>Buxus microphylla</i>	Littleleaf boxwood	F
<i>Buxus microphylla japonica</i>	Boxwood, Japanese	C,F

Scientific Name	Common Name	
<i>Buxus sempervirens</i>	Boxwood, common	C,F
<i>Callistemon citrinus</i>	Bottlebrush, lemon	C,F
<i>Cassia artemisioides</i>	Cassia, feathery	F
<i>Ceanothus americanus</i>	Jerseytea, redroot	C,F
<i>Ceanothus</i> spp.	Wild lilac	C,F
<i>Chaenomeles japonica</i>	Flowering quince	C,F
<i>Chamaecyparis obtusa</i>	Kosteri cypress	F
	Nana-dwarf Hinoki cypress	F
	Torulosa cypress	F
<i>Chamaecyparis pisifera</i>	Squarrosa Minima cypress	F
<i>Chamaecyparis pisifera</i> spp.	Filifera-thread cypress	F
<i>Chrysalidocarpus lutescens</i>	Areca palm	F
<i>Clethra</i>	Summersweet	C,F
<i>Cleyera japonica</i>	Cleyera, Japanese	C,F
<i>Coleonema pulchrum</i>	Pink breath of heaven	C,F
<i>Cornus alba</i>	Sibirica-Siberian dogwood	F
<i>Cornus kousa</i>	Dogwood, kousa	C,F
<i>Cornus stolonifera</i>	Flaviramea-yellowtwig dogwood	F
<i>Cotoneaster adpressus</i>	Praecox-early cotoneaster	F
<i>Cotoneaster apiculatus</i>	Cotoneaster, cranberry	C,F
<i>Cotoneaster buxifolius</i>	Cotoneaster, brightbead	F
<i>Cotoneaster congestus</i>	Cotoneaster, Pyrenees	F
<i>Cotoneaster dammeri</i>	Cotoneaster, bearberry	C,F
<i>Cotoneaster himalayan</i>	Himalayan cotoneaster	F
<i>Cotoneaster horizontalis</i>	Cotoneaster, rock	C,F
<i>Cotoneaster lacteus</i>	Cotoneaster, parney	C,F
<i>Cotoneaster microphyllus</i>	Cotoneaster, rockspray	F
<i>Cotoneaster salicifolia</i>	Willowleaf cotoneaster	C,F
<i>Cytisus praecox</i>	Hollandia-warminster broom	F
<i>Cytisus scoparius</i>	Lena-Scotch broom	F
<i>Dasyliirion wheeleri</i>	Sotol, desert spoon	F
<i>Deutzia crenata</i>	Nakiana-dwarf deutzia	F
<i>Dodonaea viscosa</i>	Hopseedbush, clammy	F
	Hopseed bush	F
<i>Escallonia exoniensis</i>	Escallonia	C,F
<i>Euonymus alata</i>	Euonymus, winged	F
<i>Euonymus fortunei</i>	Canadale gold euonymus	C,F
	Emerald'n gold euonymus	C,F
	Euonymus, stringybark	C,F
	Wintercreeper	C,F
<i>Euonymus japonica</i>	Euonymus, evergreen	C,F
	Silver king euonymus	F
<i>Euonymus kiatschovica</i>	Spreading euonymus	F
<i>Euonymus vegetus</i>	Bigleaf wintercreeper	C,F
<i>Fatsyhedera lizei</i>	Fatsyhedera	C,F
<i>Fatsia japonica</i>	Japanese aralia	C,F
<i>Felicia amelloides</i>	Blue marguerite	C,F
<i>Forsythia intermedia</i>	Forsythia, border	F
<i>Gardenia jasminoides</i>	Gardenia	C,F
<i>Genista pilosa</i>	Woadwaxen	F
<i>Hibiscus rosa-sinensis</i>	Ross Estey-hibiscus	F
	Hibiscus, Chinese	F
<i>Hibiscus syriacus</i>	Rose of Sharon,Red Bird	F
	Rose of Sharon,Red Heart	F
	Rose of Sharon,Woodbridge	F

Scientific Name	Common Name	
	Rose-of-Sharon (Shrubalthea)	F
<i>Hydrangea macrophylla</i>	Hydrangea, French	C, F
<i>Hydrangea quercifolia</i>	Hydrangea, Oakleaf	C, F
<i>Ilex aquifolium</i>	Balkans holly	F
	Gold coast holly	F
	Holly, English	F
<i>Ilex aquipernyi</i>	San Jose holly	C,F
<i>Ilex cornuta</i>	Dwarf Burford holly	C,F
	Holly, Chinese	C,F
<i>Ilex crenata</i>	Compacta-dwarf Japanese holly	C,F
	Convexa holly	C,F
	Helleri-Heller's Japanese holly	C,F
	Holly, Japanese	C,F
<i>Ilex glabra</i>	Nordica-inkberry holly	F
<i>Ilex meserveae</i>	Blue boy holly	F
	Blue girl holly	F
	Ebony magic holly	F
<i>Ilex vomitoria</i>	Nana-dwarf yaupon holly	C,F
	Pendula-weeping yaupon holly	C,F
	yaupon holly	C,F
<i>Juniperus chinensis</i>	Media-old gold juniper	C,F
<i>Juniperus conferta</i>	Emerald sea shore juniper	F
<i>Juniperus horizontalis</i>	Huntington blue juniper	C,F
	Wiltonii-blue carpet juniper	C,F
<i>Juniperus procumbens</i>	Nana-dwarf Japanese garden juniper	C,F
<i>Juniperus prostrata</i>	Prostrata juniper	C,F
<i>Juniperus sabina</i>	Broadmoor juniper	F
	Foemina-Hicks juniper	F
	Tamariscifolia-Tam juniper	F
<i>Juniperus scopulorum</i>	Emerald green juniper	F
<i>Juniperus spp.</i>	Juniper	C,F
<i>Juniperus squamata</i>	Blue juniper	F
	Blue star juniper	F
	Parsonii juniper	F
<i>Justicia brandegeana</i>	Shrimp plant	C,F
<i>Justicia spicigera</i>	Honeysuckle, Mexican	F
<i>Kalmia latifolia</i>	Laurel, mountain	F
<i>Lagerstroemia indica</i>	Crape myrtle	C,F
<i>Lavandula angustifolia</i>	English lavender	C,F
<i>Leucothoe axillaris</i>	Leucothoe, coast	F
<i>Leucothoe fontanesiana</i>	Leucothoe, drooping	F
<i>Ligustrum amurense</i>	Privet, amur	C,F
<i>Ligustrum japonicum</i>	Privet, Japanese	C,F
	yellow tip ligustrum	C,F
<i>Ligustrum lucidum</i>	Privet, glossy	C,F
<i>Ligustrum ovalifolium</i>	California privet	F
<i>Ligustrum texanum</i>	Howardi privet	F
	Wax leaf privet	F
<i>Ligustrum vicaryi</i>	Privet, golden	C,F
	Vicary golden privet	C,F
<i>Livistona chinensis</i>	Chinese fountain palm	F
<i>Lonicera fragrantissima</i>	Winter honeysuckle	F
<i>Lonicera periclymenum</i>	Flowering woodbine	F
	Serotina woodbine	F
<i>Lonicera sempervirens</i>	Trumpet honeysuckle	F

Scientific Name	Common Name	
<i>Lorpetalum chinense</i>	(No common name)	C,F
<i>Mahonia aquifolium</i>	Oregon grape	F
<i>Myoporum parvifolium</i>	Myoporum, prostrate	F
<i>Myrtus communis</i>	Myrtle, true	C,F
<i>Nandina domestica</i>	Compacta-dwarf heavenly bamboo	C,F
	Harbour dwarf-heavenly bamboo	C,F
	Heavenly bamboo (Nandina)	C,F
	Nana compacta-heavenly bamboo	C,F
	Nana purpurea-heavenly bamboo	C,F
	Woods dwarf-heavenly bamboo	C,F
<i>Nerium oleander</i>	Hardy red oleander	C,F
	Oleander	C,F
	Ruby lace oleander	C,F
<i>Osmanthus heterophyllus</i>	Osmanthus, holly-leaf	F
<i>Pachysandra terminalis</i>	Japanese spurge	C,F
<i>Philadelphus spp.</i>	Mockorange	C,F
<i>Phoenix roebelenii</i>	Pigmy date palm	F
<i>Photinia fraseri</i>	Fraser's photinia	C,F
	Photinia	C,F
<i>Pieris japonica</i>	Lily-of-the-valley	F
	Snowdrift lily-of-the-valley	F
	Temple bells lily-of-the-valley	F
	Valley rose lily-of-the-valley	F
	Andromeda	C,F
<i>Pittosporum spp.</i>	Pittosporum	C,F
<i>Pittosporum tobira</i>	Green pittosporum	F
	Japanese pittosporum	F
	Tobira	F
	Wheeler's dwarf pittosporum	F
<i>Platyclusus orientalis</i>	Arborvitae, Oriental	C,F
<i>Plumbago ariculata</i>	Blue cape plumbago	F
<i>Podocarpus macrophyllus</i>	Yewpine	C,F
<i>Potentilla fragiformis</i>	Cinquefoil	F
<i>Potentilla fruticosa</i>	Cinquefoil	C,F
<i>Protea neriifolia</i>	Protea	F
<i>Pyracantha coccinea</i>	Firethorn, scarlet	C,F
<i>Pyracantha fortuneana</i>	Lolendei Monrovia pyracantha	C,F
<i>Pyracantha fortuneana</i>	Monon pyracantha	C,F
	Red elf hybrid pyracantha	C,F
	Rutgers hybrid pyracantha	C,F
	Santa Cruz pyracantha	C,F
	Victory pyracantha	C,F
<i>Pyracantha skoidzumi</i>	Firethorn, formosa	C,F
<i>Pyracantha, fortuneana</i>	Firethorn	C,F
<i>Rhaphiolepis indica</i>	Enchantress-Moness raphiolepis	F
	Rhaphiolepis (India hawthorn)	C,F
	Springtime-Monme raphiolepis	F
<i>Rhaphiolepis ovata</i>	Roundleaf raphiolepis	F
<i>Rhipsalidopsis gaertneri</i>	Eastercactus	C,F
<i>Rhododendron calendulaceum</i>	Flame azalea	F
<i>Rhododendron campylocarpum</i>	Butterfly rhododendron	F
<i>Rhododendron carolinianum x daurium</i>	PJM rhododendron	F
<i>Rhododendron catawbiense</i>	Catawba album rhododendron	C,F



Scientific Name	Common Name	
	Catawba rhododendron	C,F
	Lord Roberts rhododendron	C,F
	Rocket rhododendron	C,F
<i>Rhododendron forrestii</i> x <i>griersonianum</i>	Elizabeth rhododendron	F
<i>Rhododendron hybrid</i> spp.	America rhododendron	F
	English Roseum rhododendron	F
	Nova Zembla rhododendron	F
	Scintillation rhododendron	F
<i>Rhododendron impeditum</i>	Rhododendron	F
<i>Rhododendron indica</i>	Formosa azalea	C,F
	Waucabusa azalea	C,F
<i>Rhododendron kerume</i>	Coral bells azalea	C,F
	Hino crimson azalea	C,F
	Hino pink azalea	C,F
	Snow azalea	C,F
<i>Rhododendron maximum</i>	Rhodie max (rosebay)	C,F
<i>Rhododendron mucronulatum</i>	Rhododendron	F
<i>Rhododendron satuski</i>	Gumpo pink azalea	F
	Higasa azalea	F
<i>Rhododendron</i> spp.	Azalea	C,F
	Rhododendron	C,F
<i>Rhododendron</i> spp. hybrids	Carror azalea	C,F
	Girard Roberta azalea	F
	Golden flare exbury azalea	F
<i>Rhus lancea</i>	Sumac, African	C,F
<i>Rosa rugosa</i>	Ramanas rose	F
<i>Rosmarinus officinalis</i>	Rosemary	F
<i>Senecio cineraria</i>	Dusty miller	C,F
<i>Spiraea vanhouttei</i>	Bridal wreath	F
<i>Syringa vulgaris</i>	Lilac, common	C,F
<i>Syzygium paniculata</i>	Brush cherry	C,F
<i>Taxus cuspidata</i>	Yew, Japanese	F
<i>Taxus media</i>	Yew	F
<i>Thuja occidentalis</i>	Arborvitae, American	C,F
	Emerald arborvitae	F
	Globosa-globe arborvitae	F
	Little giant-dwarf arborvitae	F
	Nigra-dark American arborvitae	F
	Pyramidalis arborvitae	F
	Rheingold arborvitae	F
	Woodwardii arborvitae	F
<i>Thuja orientalis</i>	Aureus nana-dwarf golden arborvitae	F
	Minima glauca-dwarf arborvitae	F
<i>Thuja plicata</i>	Red Cedar, Western	F
<i>Trachelospermum jasminoides</i>	Star jasmine, Chinese	F
<i>Veitchia merrilli</i>	Christmas palm	F
<i>Viburnum carlesii</i>	Koreanspice viburnum	C,F
<i>Viburnum davidii</i>	David viburnum	F
<i>Viburnum japonicum</i>	Viburnum	F
<i>Viburnum judd</i> (V X Judii)	Viburnum	C,F
<i>Viburnum opulus sterile</i>	Common snowball viburnum	F
<i>Viburnum plicatum</i>	Doublefile viburnum	F
<i>tomentosum</i>		
<i>Viburnum setigerum</i>	Tea viburnum	F

Scientific Name	Common Name	
<i>Virburnum suspensum</i>	Virburnum, Sandankwa	F
<i>Virburnum tinus</i>	Virburnum, Laurustinus	C,F
	Compactum-spring bouquet viburnum	F
<i>Virburnum tinus compactum</i>	Spring bouquet viburnum	F
<i>Virburnum trilobum compactum</i>	Dwarf cranberry bush	F
<i>Virburnum x pragense</i>	Virburnum	F
<i>Weigela florida</i>	Bristol ruby weigela	F
	Java red weigela	F
	Minuet weigela	F
	Weigela, oldfashioned	F
<i>Xylosma congestum</i>	Xylosma	F
<i>Yucca elata</i>	Yucca, soaptree	C,F
<i>Yucca recurvifolia</i>	Yucca, pendulous	F

**Groundcovers/Perennials****Recommended Culture Methods****F = Field Grown****C = Container Grown**

Scientific Name	Common Name	
<i>Agapanthus africanus</i>	Lily-of-the-Nile	C,F
<i>Ajuga</i> spp.	Carpet bugle	F
<i>Arctotheca calendula</i>	Cape weed	F
<i>Asparagus retrofractus</i>	(No common name)	C,F
<i>Asparagus varieegata</i>	Tree fern	C,F
<i>Aster novae-angliae</i>	New England aster	C,F
<i>Aster novi-belgii</i>	New York aster	C,F
<i>Athyrium nipponicum</i>	Japanese painter fern	C,F
<i>Brassica oleracea</i>	Wild cabbage	C,F
<i>Callistepheus chinensis</i>	China aster	C,F
<i>Campanula elatines</i>	Bellflower	C,F
<i>Carpobrotus edulis</i>	Ice plant, largeleaf (see label)	F
<i>Clytostoma callistegioides</i>	Trumpet vine, violet	C,F
<i>Cortaderia selloana</i>	Pampas grass	F
<i>Cuphea hyssopifolia</i>	False Mexican heather	C,F
<i>Delosperma alba</i>	White iceplant	F
<i>Dietes vegeta</i>	Fortnight lily	C,F
<i>Digitalis mertonensis</i>	Foxglove	C,F
<i>Doronicum cordatum</i>	Leopard's bane	C,F
<i>Drosanthemum floribundum</i>	Trailing rosea iceplant	F
<i>Erianthus ravennae</i>	Hardy pampus grass	C,F
<i>Festuca ovina glauca</i>	Blue fescue	F
<i>Gaillardia grandiflora</i>	Blanket flower	C,F
<i>Gazania rigens leucolaena</i>	Gazania, trailing	C,F
<i>Gazania</i> spp.	Gazania	F
<i>Hedera canariensis</i>	Ivy, Algerian	F
<i>Hedera helix</i>	Ivy, English	F
<i>Heliotropium fragrans</i>	Common heliotrope	C,F
<i>Hemerocallis</i> spp.	Daylily	C,F
<i>Hosta lancifolia</i>	Albo-marginata hosta	C,F
<i>Hosta</i> spp.	Lily, plantain	C,F
<i>Heuchera micrantha</i>	Coral bells	C,F
<i>Hypericum</i> spp.	St. Johnswort	C,F
<i>Iberis sempervirens</i>	Evergreen candytuft	C,F

Scientific Name	Common Name	
<i>Lampranthus spectabilis</i>	Trailing iceplant	F
<i>Leptospermum scaparium</i>	New Zealand teatree/Manuka	C,F
<i>Limonium perezii</i>	Statice/Sea lavender	C,F
<i>Liriope gigantea</i>	White lily turf	F
<i>Liriope muscari</i>	Lilac beauty lily turf	C,F
	Majestic lily turf	C,F
	Monroe white lily turf	C,F
	Silvery sunproof lily turf	C,F
	Variegated liriope lily turf	C,F
	Big blue lily turf	C,F
<i>Lobelia erinus</i>	Edging lobelia	C,F
<i>Lonicera japonica</i>	Honeysuckle, Japanese	F
<i>Mesembryanthemum crystallinum</i>	Ice plant (see label)	F
<i>Monarda didyma</i>	Bee Balm	C,F
<i>Ophiopogon japonicus</i>	Mondo grass	F
<i>Osteospermum fruticosum</i>	Daisy, trailing African	F
<i>Pachysandra terminalis</i>	Japanese spurge	F
<i>Pennisetum setaceum</i>	Fountaingrass	C,F
<i>Polystichum polyblepharum</i>	Tassel fern	C,F
<i>Sedum brevifolium</i>	Stonecrop	C,F
<i>Sedum kamtschaticum</i>	Stonecrop	C,F
<i>Sedum spurium</i>	Stonecrop, tworow	C,F
<i>Tulbaghia violacea</i>	Society garlic	C,F
<i>Verbena rigida</i>	Veined verbena	C,F
<i>Veronica spp.</i>	Speedwell	C,F
<i>Vinca major</i>	Periwinkle, bigleaf	F
<i>Vinca minor</i>	Periwinkle, dwarf	F

**Flowers**

**Recommended Culture Methods**

F = Field Grown  
C = Container Grown

Scientific Name	Common Name	
<i>Achillea spp.</i>	Yarrow	C,F
<i>Antirrhinum majus</i>	Snapdragon	F
<i>Caladium bicolor</i>	Caladium, fancy leafed	F
<i>Chrysanthemum spp.</i>	Chrysanthemum	C,F
Mixed hybrid	Dahlia	C,F
<i>Cladium bicolor</i>	Fancy-leaved caladium	F
<i>Coreopsis lanceolata</i>	Coreopsis	F
<i>Coreopsis verticulata</i>	Threadleaf coreopsis	C,F
<i>Dianthus barbatus</i>	Sweet William	F
<i>Dianthus gratianopolitanus</i>	Cheddar pink	C,F
<i>Dicentra spectabilis</i>	Bleeding heart	C,F
<i>Dimorphotheca spp.</i>	Marigold, cape	F
<i>Echinacea purpurea</i>	Coneflower, purple	C,F
<i>Evolvulus nuttallianus</i>	Blue daze	C,F
<i>Geum quellyon</i>	Geum	F
<i>Gladiolus hortulanus</i>	Gladiolus	F
<i>Gypsophila paniculata</i>	Baby's breath	F
<i>Impatiens wallerana</i>	Impatiens (Busy lizzie)	F
<i>Iris spp.</i>	Iris, bearded	F
<i>Liatris spicata</i>	Blazing star	C,F
<i>Pelargonium hortorum</i>	Geranium	F
<i>Petunia spp.</i>	Petunia	C,F

Scientific Name	Common Name	
<i>Portulaca grandiflora</i>	Moss, rose	F
<i>Ranunculus asiaticus</i>	Ranunculus, Persian	F
<i>Rosa</i> spp.	Rose	F
<i>Rudbeckia fulgida</i>	Blackeyed susan	C,F
<i>Rudbeckia hirta</i>	Daisy, gloriosa (black-eyed Susan)	F
<i>Salvia</i> spp.	Salvia (Sage)	F
<i>Stokesia laevis</i>	Aster, stokes	F
<i>Strelitzia reginae</i>	Bird of paradise	F
<i>Tagetes</i> spp.	Marigold	F
<i>Viola wittrockiana</i>	Pansy	F
<i>Zinnia elegans</i>	Zinnia, common	F

**Non-bearing Trees and Vines**

**Recommended Culture Methods**

F = Field Grown, C = Container Grown

almond	F	kiwi	F
apple	F	Kumquat	C,F
apricot	F	lemon	F
avocado	F	loganberry	F
blackberry	F	macadamia nut	F
blueberry	F	nectarine	F
boysenberry	F	olive	F
cherry, sour	F	orange	C,F
cherry, sweet	F	peach	F
currant	F	pear	F
dewberry	F	pecan	C,F
elderberry	F	pistachio	F
fig	F	plum	F
filbert	F	pomegranate	F
gooseberry	F	prune	F
grape, American	F	raspberry	F
grape, European	F	walnut, black	F
grapefruit	F	walnut, English	F

† Non-bearing plants are defined as those that will not bear fruit for at least one year after treatment.

**Ornamental Bulbs**

Surflan A.S. may be applied for control of susceptible annual weeds in ornamental bulbs, e.g., bulbous iris, daffodil (narcissus), hyacinth, and tulip. Apply Surflan A.S. to the soil surface 2-4 weeks after planting, but prior to the emergence of annual weeds. For fall planted bulbs, apply Surflan A.S. again in late winter or early spring to weed-free soil surfaces.

**Broadcast Application Rates**

Time of Application	Soil Texture	Surflan A.S.		Minimum Time Between Applications (months)	Total Amount Allowed Per Year (qt/acre)
		(qt/acre)	(fl oz/1000 sq ft)		
Fall	Coarse	0.75	0.5	3	1.5
Fall	Medium and Fine	1.5	1.0	3	2.25
Feb. - March	All Soil Textures	0.75	0.5	3	2.25

**Special Use Precautions:**

Do not apply to tulip plants that have emerged to a height greater than 3/4 inch.  
Do not apply to gladioli corms prior to emergence or less than one (1) inch in diameter.

**Shadehouse Areas**

Surflan A.S. may be applied to drainage areas under benches in open shadehouse-type structures where the natural flow of air is unimpeded. Do not apply in enclosed greenhouses or in enclosed shadehouse-type structures. Do not apply within 3 weeks prior to enclosure of greenhouse or poly-type structures.

**Warm Season Turfgrasses**

Surflan A.S. may be applied as a preemergence treatment for control of annual grasses and certain broadleaf weeds in established warm season turf including bahiagrass, bermudagrass, buffalograss, centipedegrass, St. Augustinegrass, zoysiagrass, and established tall fescue growing in warm season areas. Established turf is defined as a dense turf having a well-anchored root system and healthy, vigorous top growth. Use Surflan A.S. only as a part of a total turf management program that includes good fertilization practices.

Surflan A.S. may be tank mixed with Gallery\* herbicide (California registration pending) and applied preemergence to broaden the spectrum of broadleaf weed control in warm season turf. Refer to the label for Gallery for specific use directions, precautions, and limitations before use.

Any cultural practices that disturb the soil, such as aerification or verticutting, should be done prior to application of Surflan A.S.

Surflan A.S. will not control emerged weeds. Successful preemergence control of weeds listed on this label requires that Surflan A.S. be applied prior to weed germination and be activated by at least one-half (1/2) inch of rainfall or irrigation within 21 days of application.

Surflan A.S. may injure turf that is not well established or is stressed or weakened due to unfavorable winter climatic conditions, drought, nematodes, or other factors which damage or weaken turf root systems. Apply Surflan A.S. only to healthy, well-established turf that has a well-anchored root system.

Do not apply Surflan A.S. in the spring or early summer to tall fescue turfgrass reseeded the previous fall. In such cases, apply Balan\* 2.5G granular herbicide at 60-80 pounds per acre in early summer (Round 1) and Surflan A.S. at 1.5 quarts per acre approximately eight weeks later (Round 2). Do not apply Surflan A.S. at the single application rate (2 quarts per acre) to established tall fescue; in such cases, apply 1.5 quarts per acre of Surflan A.S. in an initial application, followed by a second application of 1.5 quarts per acre 8-10 weeks later.

In bermudagrass areas that have been overseeded with winter grasses, a spring application of Surflan A.S. will thin the overseeded grasses.

**Annual Grasses Controlled by Surflan A.S.**

**Summer Annuals:**

<b>Common Name</b>	<b>Scientific Name</b>
barnyardgrass (watergrass)	<i>Echinochloa crus-galli</i>
crabgrass, large	<i>Digitaria sanguinalis</i>
crabgrass, smooth	<i>Digitaria ischaemum</i>
crabgrass	<i>Digitaria spp.</i>
crowfootgrass	<i>Dactyloctenium aegyptium</i>
foxtail, bristlegrass	<i>Setaria magna</i>
foxtail, giant	<i>Setaria faberi</i>
foxtail, green	<i>Setaria viridis</i>

(pigeongrass)	
foxtail, robust	<i>Setaria robusta</i>
foxtail, yellow	<i>Setaria glauca</i>
goosegrass	<i>Eleusine indica</i>
(silver crabgrass)	
Johnsongrass	<i>Sorghum halepense</i>
(seedling only)	
ryegrass, Italian	<i>Lolium multiflorum</i>
sandbur, field	<i>Cenchrus incertus</i>

**Winter Annuals:**

<b>Common Name</b>	<b>Scientific Name</b>
bluegrass, annual	<i>Poa annua</i>

**Annual Broadleaf Weeds Controlled by Surflan A.S.**

**Summer Annuals:**

<b>Common Name</b>	<b>Scientific Name</b>
carpetweed	<i>Mollugo verticillata</i>
knotweed, prostrate	<i>Polygonum aviculare</i>
purslane, common	<i>Portulaca oleracea</i>

**Winter Annuals:**

<b>Common Name</b>	<b>Scientific Name</b>
chickweed, common	<i>Stellaria media</i>
henbit	<i>Lamium amplexicaule</i>

**Broadleaf Weeds Suppressed by Surflan A.S.**

<b>Common Name</b>	<b>Scientific Name</b>
groundsel, common	<i>Senecio vulgaris</i>
spurge, prostrate	<i>Euphorbia humistrata</i>
woodsorrel, yellow	<i>Oxalis stricta</i>

**Application Rates, Frequency, and Timing of Application**

Surflan A.S. can be applied in the spring for summer annual grass and broadleaf weed control, and in the fall for annual bluegrass (*Poa annua*) and winter annual broadleaf weed control.

**Broadcast Application Rates (Warm Season Turfgrasses)**

Use Area	Surflan A.S.		Minimum Time Between Applications (months)	Total Amount Allowed Per Year (qt/acre)
	(qt/acre)	(fl oz/1000 sq ft)		
All, except Florida	1.5	1	3	6
Florida	2	1.5	3	6
Florida	1.5	1	3	4.5

**1. Summer Annual Grasses and Broadleaf Weeds**

**Single Application Program:** Apply 2 quarts per acre of Surflan A.S. in late winter or early spring, prior to the onset of conditions favorable for annual weed germination.

**Split Application Program:** As an alternative to a single application program, Surflan A.S. may be applied in a split application. This program is desirable when the initial application is made well in advance of weed germination and where weed control is desired for a longer period of time. Apply 1.5 quarts per acre of Surflan A.S. in an initial application, followed by a second application of 1.5 quarts per acre 8-10 weeks later.

The second treatment of the split application may follow application of a different preemergence grass herbicide in place of the initial application of Surflan A.S..

## 2. Annual Bluegrass (*Poa annua*) and Winter Annual Broadleaf Weeds

In areas of heavy annual bluegrass infestation, its elimination will result in temporary thinning of turfgrass cover. Proper fertilization, irrigation, and soil incorporated reseeding should be employed to speed the restoration of desirable turfgrass cover in areas previously occupied by annual bluegrass (see section on reseeding).

Apply Surflan A.S. as a preemergence treatment in late summer or early fall, prior to the expected germination period for annual bluegrass and winter annual broadleaf weeds. If annual bluegrass infestation is severe and its elimination will result in thinning of turfgrass cover, apply Surflan A.S. at 1.5 quarts per acre. If thinning of turfgrass cover is not a potential problem, Surflan A.S. may be applied at 2 quarts per acre.

### Weed Control in Florida

In Florida, apply 1.5 quarts per acre of Surflan A.S. three times per year, or every 90-100 days, in the fall, early spring, and early summer. Do not apply more than 1.5 quarts per acre of Surflan A.S. in any single application.

### Application Equipment

Apply Surflan A.S. evenly over the turfgrass area. Avoid spray pattern skips and overlaps that may result in incomplete coverage or over-application. For best results, use application equipment designed to uniformly broadcast liquid herbicides. Calibrate application equipment prior to use, according to manufacturer's directions. Check equipment frequently to make sure it is working properly and distributing spray uniformly.

### Reseeding

Herbicides that control annual weeds may also affect establishment of desirable turfgrass seedlings. Reseeding should be delayed for at least 90-120 days following application of Surflan A.S.. When reseeding, it is essential that proper cultural practices such as soil cultivation and seedbed preparation, irrigation, and fertilization be followed. For satisfactory reseeding results following use of Surflan A.S., the seeding rate should be increased and equipment designed to place seed in full contact with soil (such as the Rogers Aero Seeder) should be employed.

### Special Use Precautions:

To avoid possible injury, do not apply Surflan A.S. to:

- Cool season turfgrass species.
- Golf course putting greens and tees or lawns containing dichondra or cool season turfgrass species.
- Newly sprigged or sodded areas of bermudagrass, St. Augustinegrass, centipedegrass, or zoysiagrass until these turfgrasses are well established and have well-anchored root systems.
- Newly hydromulched areas of bermudagrass until such areas are well established.
- Bermudagrass variety "Sun Turf" when tank mixed with atrazine.

---

## Other Uses

---

Apply Surflan A.S. as a preemergence treatment to control annual grasses and broadleaf weeds listed in "General Information" section. Observe all precautions and restrictions in the "General Information" section.

## Christmas Tree Plantations

### Surflan A.S. - Alone

32  
34

Apply Surflan A. S. as a directed spray to the soil surface or as an overtop spray to established plantings of field grown Christmas tree species, including fir (*Abies* spp.), pine (*Pinus* spp.), and spruce (*Picea* spp.). Follow all instructions provided in the "General Information" section of this label.

**Broadcast Application Rates**

Length of Control	Surflan A.S.		Minimum Time Between Applications (months)	Total Amount Allowed Per Year (qt/acre)
	(qt/acre)	(fl oz/1000 sq ft)		
2 - 4 months	2	1.5	2	8
4 - 8 months	4	3	2	8

**Tank Mix Combinations**

Tank mix combinations of Surflan A. S. plus other labeled herbicides may be used as directed or overtop sprays in established Christmas tree plantings. When applied according to use directions, these tank mixes will provide control of susceptible weed species listed on the respective product labels. Refer to label of the product to be tank mixed with Surflan A.S. for specific use directions, precautions and limitations before use.

**Surflan A. S. herbicide Plus Glyphosate Herbicide:** Apply tank mix combinations of Surflan A. S. plus glyphosate herbicide only as directed sprays in Christmas tree plantings. When applied according to use directions, Surflan A. S. plus glyphosate herbicide will provide postemergence control of susceptible weed species listed on the label for glyphosate herbicide and residual preemergence control of susceptible weed species listed on the label for Surflan A.S. Refer to the label for glyphosate herbicide for specific use directions, precautions and limitations before use.

**Precautions:**

- Do not apply to Douglas-fir (*Pseudotsuga menziesii*).
- Do not apply to seedbeds or seedling transplant beds.
- Apply only to established plantings. Established plantings are defined as those that have been transplanted into their final growing location for a sufficient period of time to allow the soil to be firmly settled around the roots from packing and rainfall or irrigation.
- Do not apply sprays containing glyphosate herbicide over the top of Christmas tree plantings.
- Extreme care must be exercised to avoid contact of spray containing glyphosate herbicide with foliage and stems of Christmas trees or severe damage or death may result.

**Established Trees Grown for Pulp**

Surflan A.S. herbicide may be applied as a preemergence treatment in plantations of established<sup>†</sup> trees grown for pulp. Applications may be made prior to the expected time of weed germination or immediately after tillage or herbicide treatments to destroy existing weeds. Refer to the "General Information" section for a listing of grasses and broadleaf weeds controlled, mixing directions and General Use Precautions. Optimum herbicidal activity occurs when Surflan A.S. is applied directly to the soil surface following tillage or applications of contact or translocated herbicides to destroy existing weeds, and weed residues, prunings and trash are removed or thoroughly mixed into the soil using tillage equipment.

<sup>†</sup> Established plantings are defined as trees that have been transplanted into their final growing location for a sufficient period of time to allow the soil to be firmly settled around the roots as a result of rainfall or irrigation.

**Activation and Cultivation:** A single 1/2 to 1 inch rainfall or sprinkler irrigation is required to activate Surflan A.S. and move the herbicide into the zone of weed germination. Rainfall or irrigation of 1 inch or more is needed to activate Surflan A.S. on fine-textured, high organic matter soils. If weeds begin to



emerge, shallow cultivation to a depth of 1 to 2 inches will destroy existing weeds and place Surflan A.S. in the zone of weed germination.

**Broadcast Application Rates**

Soil Texture	Length of Control	Surflan A.S. (qt/acre)	Minimum Time Between Applications (months)	Total Amount Allowed Per Year (qt/acre/)
All Soil Textures	Short Term (2 - 4 months)	2	2.5	12
	Long Term (6 - 8 months)	4	2.5	12
	(8 - 12 months)	6	2.5	12

**Chemigation**

Surflan A.S. may be applied through properly equipped chemigation systems for weed control in tree plantations grown for pulp. Refer to "Chemigation" in "General Information" for use directions. Do not apply Surflan A.S. by chemigation unless these use directions are carefully followed.

Apply Surflan A.S. by chemigation prior to weed germination or immediately after existing weeds have been controlled. Control existing unwanted vegetation by tillage or with a contact or translocated herbicide. Use broadcast application rates recommended for Surflan A.S. alone. Apply in sprinkler irrigation equal to 1/2 to 1 inch of water on medium to fine textured or high organic matter soils.

**Chemigation Use Precautions:** Apply this product only through solid set or hand move systems designed to distribute sprinkler irrigation beneath the tree canopy. Solid set systems utilizing tall risers for overhead application are excluded, except for dormant season applications of Surflan A.S. Do not apply this product through any other type of irrigation system.

**Tank Mix Recommendations**

To broaden the spectrum of weed control, Surflan A.S. may be applied in tank mix combination with labeled rates of other herbicide products, provided such products are labeled for use. Performance and risk of carryover from tank mixed products used in combination with Surflan A.S. at recommended rates is the same as when each product is used separately.

**Noncropland Areas and Industrial Sites**

**Noncropland Areas - Tank Mix Combinations**

Tank mix combinations of Surflan A.S. plus glyphosate and many other labeled herbicides may be used to control undesirable vegetation in noncropland areas such as roadsides, rights-of-way, etc. When applied according to labeled directions, these tank mixes will provide control of susceptible weed species listed on the respective product labels. Refer to tank mix product labels for specific use directions, precautions, and limitations before use.

**Broadcast Application Rates**

Length of Control	Surflan A.S.		Minimum Time Between Applications (months)	Total Amount Allowed Per Year (qt/acre)
	(qt/acre)	(fl oz/1000 sq ft)		
2 - 4 months	2	1.5	2	6
4 - 8 months	4	3	4	12
8 - 12 months	6	4.5	8	12

**Industrial Sites - Tank Mix Combinations**

Tank mix combinations of Surflan A.S. plus glyphosate, Spike\* herbicide, and many other labeled herbicides may be used as overtop sprays to control existing vegetation on industrial sites such as utility substations, highway guard rails, sign posts, and delineators. When applied according to labeled use directions, these tank mixes will provide control of susceptible weed species listed on the respective product labels. Refer to tank mix product labels for specific use directions, precautions, and limitation before use.

**IMPORTANT INFORMATION  
READ BEFORE USING PRODUCT**

**CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY**

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

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

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

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

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

Surflan is a Registered Trademark of United Phosphorus, Inc.