

Surround® WP

Crop protectant

Surround® WP Crop Protectant Forms a Barrier Film, Which Acts as a Broad Spectrum Agricultural Crop Protectant for Controlling Damage from Various Insect and Disease Pests, Growth Enhancer, and as a Protectant Against Sunburn and Heat Stress

Active Ingredient:	
Kaolin	95.0%
Other Ingredients:	5.0%
Total	100.0%

**KEEP OUT OF REACH
OF CHILDREN
CAUTION**

NOT A PLANT FOOD INGREDIENT

PRECAUTIONARY STATEMENTS

HAZARD TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Causes moderate eye irritation. Avoid contact with eyes or clothing. May cause irritation to the respiratory system. Avoid breathing dust or mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

PERSONAL PROTECTIVE EQUIPMENT

Applicators and other handlers must wear:

Long sleeved shirt, long pants, socks and shoes, and a dust/mist-filtering respirator (MSHA/NIOSH approval number prefix TC-21C), or a NIOSH approved respirator with any N. R. P. or HE filter.

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

Nuisance dust masks and goggles provide the best protection for harvesters especially when plants are shaken during harvest.

ENVIRONMENTAL HAZARDS

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

Growth enhancer uses are not registered in California.

The use of Surround® WP product in agricultural crop protection applications is covered by US Patents 6,027,740; 6,069,112; 6,110,867 and 6,156,327.

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.
HOT LINE NUMBER	
You may contact 1-800-424-9300 for emergency medical treatment information.	

Manufactured by:
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www.engelhard.com/surround

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Label-US-04-1AL/GA (S)



DIRECTIONS FOR USE

AGRICULTURAL USE REQUIREMENTS

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. 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, in forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation. In nurseries and greenhouses workers are prohibited in the treated area and 25 feet in all directions of the nursery or the enclosed treated area until application is complete. **The restricted-entry interval (REI) is 4 hours from the time of application. Do not allow worker entry into treated areas during the restricted-entry interval (REI).** Personal protection equipment required for early entry workers are long-sleeved shirts, long pants, and shoes plus socks.

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

Do not apply Surround WP through any type of irrigation system.

Surround WP should be used only in accordance with recommendations on this label or in separately published Engelhard supplemental labeling recommendations.

I. GENERAL INFORMATION

Surround WP crop protectant forms a mineral-based particle film intended for protection of agricultural crops, and plants in nurseries, and greenhouses. When Surround WP is applied to plants, a dry white film results. Many pests are listed as suppressed, which means that full control may not be achieved, and supplemental methods may be needed to enhance the level of control. Thorough, uniform, and consistent coverage is essential throughout the infestation or stress period.

Pre-harvest intervals (PHI): Surround WP may be applied up to the day of harvest.

For fresh market crops that will not be washed or for field packed crops where a residual white film is not desired, applications should be made early-season only. White residue at harvest may be minimized if applications to smooth skin crops like apples stop when the fruit is approximately 1/4 of its expected size.

Plant Response Precautions: Surround WP keeps plant surfaces cooler and an advance or delay in maturity may result. Pome and stone fruit may have maturity delays of 3 to 7 days, especially in cool regions.

a. Mix Instructions:

For Agitating Sprayer Tanks

1. Slowly add Surround WP powder into the water in a recirculating sprayer tank, making sure to keep agitation brisk. It is not recommended to add Surround WP to a sprayer tank that does not have adequate agitation. A pre-mix tank may speed up loading operations if sprayer does not have mechanical agitation. Add directly into the mix basket if pump recirculation empties into the mix basket. If there is no mix basket, add Surround WP very slowly to the recirculating water. Avoid dumping Surround WP directly into the pump intake area as this could plug the filter or intake. Mix thoroughly.
2. Add tank mix pesticides, if any.
3. Continue agitation until all of the material is sprayed from the tank.
4. At the end of the application, spray until empty and flush system and nozzles with fresh water. Periodically check in-line strainer and clean if necessary. Properly dispose of rinse water.

For Non-Agitating Sprayer Tanks, Such as Handheld and Backpack Sprayers

The following mixing sequence must be followed:

1. Use Surround WP powder at a rate of 1/4 to 1/2 lb of Surround WP powder per one gallon of water. One-half pound is approximately 3 cups. For sprayers difficult to shake, premix in a 5 gallon bucket per the directions below and pour suspension into sprayer.
2. Add Surround WP powder into 1/4 to 1/2 of the water that will be used in the batch to allow adequate space for vigorous shaking. Allow Surround WP to wet and sink into the water slowly. It is not recommended to fill with a hose or shake the container while powder is floating on top of the water.
3. Mix thoroughly by shaking the closed container vigorously for 30 seconds.
4. Add tank mix pesticides, if any.
5. Add the remainder of the batch water and shake the closed container for an additional 30 seconds.
6. Shake the sprayer occasionally during application.

7. At the end of the application, spray until empty and flush system and nozzles or, blow air pressure out of the line and nozzle (usually by upending) and store in a cool place. Apply the leftover mix within two to three weeks to avoid spoilage. Rinse the sprayer and allow to air-dry before the next batch.

b. Compatibility:

Surround WP is not generally affected by most other insecticides, miticides, and fungicides. However, the user should test tank mixes before use. When mixing with other products, make up a small batch and observe slurry and film characteristics. Curdling, precipitation, spray beading and/or excessive run-off leading to lack of film formation, or changes in viscosity are signs of incompatibility. **Add tank mix pesticides after the Surround WP powder has been added.** Use of anti-foaming agents may interfere with proper coverage. Oil tank mixes may temporarily reduce the whiteness of the film. Oversprays of products that require absorption into the plant should use adequate fluid amounts to wet the Surround WP film.

Tank mixing with other white mineral particulate products such as diatomaceous earth, or other sunburn materials, such as those containing wax, latex or polymer based materials can lead to postharvest washoff problems. Applications of Surround WP over such products or oversprays of such products over Surround WP can also impair post harvest wash off. See Engelhard supplemental labeling for further information on use of spreader/stickers, foliage fertilizers, pesticides, PGR's and other spray materials with Surround WP.

c. General Application Guidelines (see also, specific crop use instructions):

Rates: Rate is dependent on the amount of foliage that needs to be covered.

Concentration (the amount of Surround WP per 100 gallons of water): The best concentration of Surround WP is between 25 to 50 lbs. Surround WP per 100 gallons, but concentrations of up to 100 lbs. per 100 gallons are allowed for specific crop uses.

Coverage: Use sufficient spray volume to obtain thorough **near-drip** coverage. Two or more applications are desirable for complete coverage. For optimal performance as an insecticide, applications must coat all portions of plant that are to be protected, including both sides of the leaves. Apply an additional spray if coverage is insufficient. Spreading on waxy plant surfaces is usually better when the plant surface is warm.

Dwarf, semi-dwarf, and otherwise well-pruned trees will be easier to cover than large trees. Optimum efficacy may be more difficult to achieve in large trees due to increased difficulty achieving thorough coverage.

Applications to tree crops can be made with commercial air blast or high-pressure sprayers that provide enough air turbulence to coat both sides of the leaves, bark, and fruit. The best coverage is achieved at a tractor speed of less than 3 mph when using airblast sprayers.

Plant Color Change: Plant surfaces will typically turn a hazy white color after drying. Additional treatments will turn the plant surfaces a deeper white. This is normal, and indicates appropriate film formation.

Foliage Dryness: Applications to dripping wet foliage can provide inadequate coverage.

Under Hot, Dry Conditions: Under very hot and dry conditions, increase volume of water and droplet size to improve deposition.

Spray Methods: Air blast, high-pressure handgun, or boom sprayers provide the best results. Chemigation is not recommended. Observe specific crop label instructions for directions regarding spray volume. Calibrate spray equipment per equipment manufacturer to deliver the required volume. At given concentrations, the flow rate of suspended Surround WP is similar to water. Strainers, preferably no finer than 40 mesh, in the spray system and behind each nozzle per normal practice helps to reduce nozzle clogging.

When the dry foliage has lost its white appearance or when gently rubbing the treated area with a dark piece of cloth does not leave a white residue on the cloth, reapplication is necessary. Heavy rainfall, new growth, and wind erosion will affect film quality. Reapply to re-establish coverage after heavy rain as soon as the foliage is dry. However, reapplication may not be necessary if all target surfaces remain thoroughly coated and insect pressure is light. Excessively thick coatings can provide poor performance.

Overhead Irrigation and Overhead Cooling: Overhead irrigation may wash off the film and reduced efficacy will result. Overhead irrigation is not preferred, but, if used, should be used just prior to the next application to prevent premature wash-off of a freshly-applied spray. Wait until there are no visible water droplets on foliage to apply Surround WP after overhead irrigation. Use of overhead cooling will decrease the effectiveness of Surround WP.

Aerial Application: Surround WP applied by air may reduce heat stress and sunburn damage if sufficient coverage can be achieved and maintained. Aerial applications may not be effective for controlling insects or diseases. It is best when using aerial applications to take all precautions needed to minimize or eliminate drift, e.g., do not spray under windy or gusty conditions. It is best to make applications not more than ten feet above the top of the largest plant unless a greater height is required for aircraft safety. It is best when making applications at low relative humidity to increase droplet size to compensate for evaporation. It is not recommended to use spray drift agents not approved by Engelhard.

Non-Target Surfaces: It is not recommended to spray where the resulting visible white film will be undesirable or cannot be washed off, such as porous wood, masonry, asphalt, and other valuable goods.

d. Growth Enhancer, Sunburn and Heat Stress Protectant:

When applied at given rates and frequencies, benefits such as increased plant vigor and improved yields may occur on many crops. Under high ambient temperatures, Surround WP reduces canopy temperature and, therefore, can help to reduce heat and water stress. When Surround WP is used, many fruits have shown improved fruit color, soluble solids, smoothness, and size with less russet, dropping, sunburn, and cracking.

Sunburn Suppression: Apply to sunburn-prone fruit, leaf, or limb and trunk bark surfaces before conditions leading to sunburn occur. If initiating sprays for sunburn suppression where there have been no prior sprays, it is recommended that thorough coverage of all fruit or other plant surfaces should be in place prior to sunburn-causing conditions with one to two full rate applications 7 days apart. Depending upon the length of the high heat period, three to four applications in total may be needed, with subsequent applications every 7 to 21 days. Good coverage on typical semi-dwarf trees is best achieved with the initial one to two sprays at 50 lbs in 100 to 200 gallons per acre to achieve **near-drip** coverage on the fruit or other plant surfaces. However, if allowed (see specific crop group directions), up to 100 lbs/100 gallons are allowed when spray frequencies need to be reduced. Subsequent applications may be made at half to full rates if even coverage is maintained throughout the high heat period. Under windy conditions, Surround WP may be rubbed off by leaf movement making reapplication necessary.

Aerial Application: Aerial applications for sunburn and heat stress reduction are best made at concentrations of no more than 1 lb. of Surround WP per 1 gallon of water. Use no less than 10 gallons per acre, but on trees 20 or more gallons per acre are preferred. Repeat applications 3 to 4 times per above intervals or as necessary to establish and maintain even coverage on fruit surfaces throughout the high heat period. See aerial applications under I c.

e. Packing and Processing:

Washing is required unless only early season applications are made and the film weathers off before harvest. Most residues wash off with packing line brushing and forced water sprays. An approved washing detergent may be helpful if used in the packing line and/or wash tank. A pre-harvest washing trial is recommended to determine if a washing detergent is necessary. Waxing further improves fruit appearance.

For fresh market apples that will not be waxed, such as apples for organic markets or specific export markets that do not accept waxed apples: It is not recommended that Surround WP be applied any later than two months prior to harvest, as slight traces of white may still be visible after washing. This especially applies to 'Red Delicious' and 'Braeburn' varieties.

II. CROP GROUPS

a. Tree Fruit:

Volume: Apply to **near-drip**. Do not apply to run-off to avoid waste and poor coverage. For typical semi-dwarf trees in full foliage, it is recommended to use 100 to 200 gallons per acre. Adjust volume per Tree Row Volume to achieve **near-drip** for larger or smaller trees.

Concentration (the amount of Surround WP per 100 gallons of water): It is best to use 25 to 50 lbs Surround WP per 100 gallons of water, but concentrations of up to 100 lbs per 100 gallons are allowed. Early applications typically use 37.5 to 50 lbs per 100 gallons of water per acre while follow-up applications may only require 12.5 to 25 lbs (25 lbs is preferred) per 100 gallons of water per acre.

Pome Fruits

Such as apple, crabapple, quince, pear, and loquat

PEST	LBS/ACRE	RECOMMENDATIONS
Pear psylla	50'	<ul style="list-style-type: none"> • On mature pear trees 100-200 gal/acre is recommended. • Prebloom: Apply 3 applications, applying every 7-10 days starting at delayed dormant, but no later than green cluster bud. • Petal Fall: Apply 3 applications, applying every 7-14 days starting at first petal fall. • Spring populations can be reduced with a fall or winter application.

Pome Fruits *continued*

Such as apple, crabapple, quince, pear, and loquat

PEST	LBS/ACRE	RECOMMENDATIONS
Insects Pear: Cutworms, pear midge, pear slug Apple: Apple sucker, climbing cutworm, eastern tent caterpillar, Gypsy moth, Japanese beetle, June beetle Pear and Apple: Grasshoppers, green fruit worm, leafrollers, Lygus bug, Mormon cricket, periodical cicada, stink bug, tarnished plant bug, thrips	25-50	Suppression only*. Start before infestation and continue at 7-14 day intervals. Widening respray interval past 14 days is not recommended.
Apple or Pear Diseases Fabrea leafspot	25-50	Suppression only*. Apply prior to conditions favoring disease development and maintain coverage throughout the disease infection period. Supplements are generally necessary especially in high-pressure areas.
Over-wintering leafrollers, especially obliquebanded leafroller (OBLR)	25-50	Apply 2 sprays 7 days apart starting just prior to green tip or at initial emergence of leafroller larvae.
Leafhoppers ²	25-50	Apply first spray within 3 days of first petal fall or at initial infestation. Continue every 7-14 days during infestation period.
Lacania	25-50	<ul style="list-style-type: none"> • Oviposition: Apply at least one spray at start of oviposition. A second spray within 5-7 days is recommended. • Egg Hatch: Apply 2-3 sprays starting at initial egg hatch and continuing at 7-day intervals. • Surround WP may be used for the later generation of lacania if fruit will be thoroughly washed prior to picking or packing.
Apple maggot	25-50	Apply 2 sprays 7 days apart before expected oviposition or first detection of infestation. Continue applications every 7-14 days to keep fruit completely covered during egg lay period.
Codling moth (first generation only), oriental fruit moth, plum curculio	25-50	Suppression only*. Apply at biofix or first detection. Continue applications every 7 days to keep fruit completely covered during egg lay period.
Sunburn and heat stress	25-50	See I d.

¹ Rates of 100 lbs in 100 to 200 gallons allowed on pear trees during prebloom for high infestation.

² Applications at petal fall may disrupt leaf miner parasitism, requiring control measures.

* Supplemental controls may be needed for complete control.

Horticultural Benefits

Surround WP may improve fruit quality (see I d for general horticultural benefits) if applications start at petal fall and are continued until mid to late season. For petal fall applications, see footnote 2 above about leaf miner. Many pear cultivars, particularly Comice and Anjou varieties have shown improved fruit color, smoothness, and size with less russet when Surround WP is used. Some apple cultivars have shown less bitter pit and corking in season-long programs.

Diseases

Surround WP may enhance the efficacy of wettable sulfur and/or lime-sulfur against scab, powdery mildew, sooty blotch, and flyspeck. See Product Guides for specific mixture directions. The use of wettable type sulfurs are preferred if tank mixing sulfur with Surround WP. Elemental sulfurs should not be tank-mixed with Surround WP.

Non-waxed Fresh Apples and Pears (also, see I e.)

For fresh market apples and pears that will **not** be waxed, such as fruit for organic markets or specific export markets that do not accept waxed fruit: It is best that Surround WP **not** be applied any later than two months prior to harvest as slight traces of white may still be visible after washing. This especially applies to 'Red Delicious' and 'Braeburn' cultivars.

Stone Fruit

Such as apricot¹, sweet or tart cherries¹, nectarine¹, peach¹, plum¹, pluot¹, plumcot¹, and prune

PEST	LBS/ACRE	RECOMMENDATIONS
Japanese beetle, rose chafer	25-50	Suppression only*. Start one week prior to expected infestation and follow with 3–4 applications at 5–7 day intervals.
Obliquebanded leafroller (OBLR), thrips	25-50	Suppression only for OBLR*. Start at pink bud and continue applications at 5–7 day intervals through jacket split.
Leafhoppers including sharpshooters	25-50	Suppression only*. Start before expected infestation, if possible. <ul style="list-style-type: none"> • Until harvest: Apply at 7–14 day intervals up to bloom. • Post harvest: Apply 2 or more applications at 7–14 day intervals.
Cherry fruit flies, grasshoppers, June beetle, leafhoppers, navel orange worm, oriental fruit moth	25-50	Suppression only*. Start before expected infestation, if possible, and continue at 7–14 day intervals.
Plum curculio	25-50	Suppression only*. Apply at 7 day intervals throughout egg laying period.
Sunburn and heat stress ²	25-100	See I d.

¹ Sprays from jacket split until harvest are recommended for processing fruit only.
² Rate of 100 lbs. in 100 to 200 gallons is allowed for post-harvest sunburn and heat stress use.
* Supplemental controls may be needed for complete control.

Special Directions

Special Washing Considerations for Stone Fruit: For fresh market fruit, special washing is required; especially for fuzzy peaches. Most residues wash off with brushing and forced water sprays. An approved fruit cleaning detergent may be used in packing line and/or wash tank. Prior to brushing, a pre-soak in approved fruit cleaning detergent is usually needed for fuzzy peaches. A pre-harvest washing trial is a good practice to determine if a detergent is necessary. Waxing further improves fruit appearance. If fresh market peaches cannot be washed as noted above, discontinue sprays when the fruit are approximately 3/4 inch in diameter. Residues of Surround WP do not affect processed fruit quality.

If cherries are for fresh market, discontinue application when fruit are half size (approximately 1/4 inch) if no washing is available.

Citrus Fruits

Such as lemon, lime, grapefruit, mandarin, satsuma mandarin, pummelo, manadrin, tangelos, kumquat, and oranges

PEST	LBS/ACRE	RECOMMENDATIONS
Thrips	25-75 ¹	Start at pre-bloom. Continue at 5–7 day intervals throughout bloom. Post-bloom continue at 7–14 day intervals through infestation.
Leafhoppers including sharpshooters	25-75 ¹	Suppression only*. <ul style="list-style-type: none"> • Apply every 7–14 days as infestation occurs. • Near-harvest: Apply at least 2 applications 7 days apart for pre-harvest control of sharpshooters.
Citrus psyllid, diapaepes root weevil, grasshoppers	25-75 ¹	Suppression only*. Apply every 7–14 days as infestation occurs.
Sunburn and heat stress	25-75 ¹	See I d. It is recommended to spray before growth flushes.

¹ 50 lbs per 200 gallons per acre preferred for 12 foot trees. Only for small nursery stock are 25 lb rates recommended.
* Supplemental controls may be needed for complete control.

b. Nut Crops:

Volume: Apply to **near-drip**, not to excessive run-off. For 20-foot trees, it is best to use 200 gallons per acre. Large trees like walnut and pecan may require up to 300 gallons per acre.

Concentration (the amount of Surround WP per 100 gallons of water): It is best to use 25 to 50 lbs Surround WP per 100 gallons of water.

Tree Nuts

Such as almond, beech nut, Brazil nut, butternut, chestnut, cashew, filbert, hickory nut, macadamia nut, pecan, walnut, and including pistachio

PEST	LBS/ACRE	RECOMMENDATIONS
Aphids such as pecan, black, and yellow aphid, codling moth, grasshoppers, husk fly, leafhoppers, naval orangeworm, stink bug	25-75 ¹	Suppression only*. Start at biofix or as infestation occurs. Apply every 7–14 days throughout infestation. For codling moth, apply a minimum of 2 sprays per generation.
Sunburn and heat stress	25-75 ¹	See I d.

¹ 50 lbs per 200 gallons per acre preferred. Only for small trees or nursery stock are 25 lb rates recommended.
* Supplemental controls may be needed for complete control.

c. Small Fruits:

Volume: Apply to **near-drip**. Do not apply to run-off to avoid waste and poor coverage. The volume of water/acre required will increase throughout the growing season in relationship to the increasing size of the crop and its foliage.

Concentration (the amount of Surround WP per 100 gallons of water): It is best to use 25 to 50 lbs Surround WP per 100 gallons of water.

Berries

Such as blackberry, raspberry, dewberry, boysenberry, loganberry, elderberry, blueberry, ribes such as currant and gooseberry, and including cranberry

PEST	LBS/ACRE	RECOMMENDATIONS
Blackberry psyllid, grasshoppers, Japanese beetle, leafhoppers, leafrollers, plum curculio, rose chafer, thrips	12.5-50 ¹	Suppression only*. Begin applications after fruit set and prior to infestation, applying every 7–14 days.
Blueberry maggot	12.5-50 ¹	Suppression only*. Apply 2 sprays 7 days apart before expected infestation or first detection of infestation. Continue applications every 7–14 days during egg lay period.
Sunburn and heat stress	12.5-50 ¹	See I d.

¹ 25 lbs per 50 gallons per acre preferred.
* Supplemental controls may be needed for complete control.

Special Directions

Application on fresh market berries is only recommended up to the first three weeks after fruit set as trace residues may be difficult to remove after harvest. Application of plain water via normal sprayer prior to harvest may help to reduce Surround WP residues. Processing blueberries can be washed using detergent and water sprayers capable of rinsing away residues in the packing line. Minor residues of Surround WP on blueberries for processing are acceptable provided no other pesticides are also present.

Grapes

PEST	LBS/ACRE	RECOMMENDATIONS
Thrips	12.5-50 ¹	Apply 1–2 applications 7 days apart when pest reaches treatment threshold.
Rose chafer, omnivorous leafroller, grape leafroller, grape leaf folder, grasshoppers, grape leaf skeletonizer, Japanese beetle, June beetle	12.5-50 ¹	Suppression only*. Start at biofix or as infestation occurs, applying a minimum of 2–3 applications by applying every 7–14 days.
Leafhoppers including sharpshooter	12.5-50 ¹	Apply initial application as infestation occurs, applying at least 2-3 applications by applying every 7–14 days throughout the infestation.
Sunburn and heat stress	12.5-50 ¹	See I d.

¹ 25 lbs. in 50 gallons per acre preferred.

* Supplemental controls may be needed for complete control.

Special Directions

Wine grapes: Harvest parameters may be altered and maturity may be delayed especially in white wine varieties. Closely monitor harvest parameters to determine optimal time to harvest. Changes in harvest parameters can affect final taste. Wine grapes sprayed up to veraison will have minimal adherence to berries. Applications after veraison will adhere more on grape berries.

Raisin grapes: It is best that raisin grapes be sprayed only up to bunch closing, then may be continued post harvest.

Table grapes: It is not recommended to spray table grapes from first bloom to harvest as white residue may remain on the rachis and fruit until harvest. Infestations may be sprayed up to first bloom, and again after harvest.

d. Field Vegetables:

Volume: Apply to **near-drip**. Do not apply to run-off to avoid waste and poor coverage. The volume of water/acre required will increase throughout the growing season in relationship to the increasing size of the crop and its foliage. Seedlings will need less water and a lower amount of Surround WP than fully mature plants to uniformly coat their surfaces. Adjust the volume of water and rate used throughout the season based upon plant size. Lower volumes and rates are typically used only for immature plants.

Concentration (the amount of Surround per 100 gallons of water): It is best to use 25 to 50 lbs Surround WP per 100 gallons of water.

Legume Vegetables

Such as beans, pea, chickpeas, and soybean

PEST	LBS/ACRE	RECOMMENDATIONS
Bean leaf beetle, flea beetles, grasshoppers, Japanese beetle, leafhoppers, Mexican bean beetle, three cornered alfalfa hopper, thrips	12.5-25	Suppression only*. Start prior to infestation, applying every 7–14 days throughout infestation.
Sunburn and heat stress	25-100	See I d.

* Supplemental controls may be needed for complete control.

Special Directions

Beans such as string beans may be difficult to wash and applications should only be sprayed when the beans are small. It is not recommended to apply to other field and garden vegetables if they are intended for the fresh market and cannot be adequately washed after harvest to completely remove Surround WP residues. Minor residues of Surround WP on field and garden vegetables for processing are acceptable provided no other pesticides are also present.

Root and Tuber Vegetables

Such as potato, garden beet, sugar beet, horseradish, radish, ginseng, rutabaga, carrot, ginger, sweet potato, yams, and turnip

PEST	LBS/ACRE	RECOMMENDATIONS
Flea beetles, grasshoppers, leafhoppers	12.5-25	Suppression only*. Start prior to infestation, applying every 7–14 days throughout infestation.
Sunburn and heat stress	25-50	See I d.

* Supplemental controls may be needed for complete control.

Fruiting Vegetables

Such as tomato, pepper¹ and including eggplant¹

PEST	LBS/ACRE	RECOMMENDATIONS
Cucumber beetles, flea beetles, grasshoppers, leafhoppers, thrips	12.5-50 ²	Suppression only*. Start prior to infestation, applying every 7–14 days throughout infestation.
Sunburn and heat stress	25-100	See I d.

¹ For fresh market apply only up to 1/4 of fruit size unless washing capabilities are sufficient.
² 12.5 lbs/25 gallons preferred up to fruit set.
 * Supplemental controls may be needed for complete control.

Bulb Vegetables

Such as onions, garlic, leek, and shallot

PEST	LBS/ACRE	RECOMMENDATIONS
Thrips	12.5-50	Suppression only*. Start prior to infestation and apply every 5–7 days throughout infestation. Good coverage down into the plant crown is essential for efficacy. This may be assisted with an Engelhard-approved spreader.
Sunburn and heat stress	25-100	See I d.

* Supplemental pest control methods may be needed to aid control.

Cucurbit Vegetables

Such as cucumber, summer and winter squash, pumpkin, citron melon, muskmelon, and watermelon

PEST	LBS/ACRE	RECOMMENDATIONS
Cucumber beetle, grasshoppers	12.5-25	Suppression only*. Start prior to infestation, applying every 5–7 days, with the first two applications 3 days apart.
Powdery mildew	12.5-25	Suppression only*. Apply every 7–14 days as required to maintain coverage.
Sunburn and heat stress	25-100	See I d.

* Supplemental controls may be needed for complete control.

Brassica (Cole) Leafy Vegetables

Such as broccolis, Brussels sprouts, Chinese cabbages, cauliflower, collards, cabbages, mustard greens, kale, canola, and kohlrabi

PEST	LBS/ACRE	RECOMMENDATIONS
Flea beetles, grasshoppers	12.5-25	Suppression only*. Use only in early season to avoid residue at harvest. Apply every 7–10 days making sure to wet the plant surface completely. See Engelhard supplementary literature for recommendations to aid spreading on waxy brassica surfaces.
Sunburn and heat stress	12.5-25	See I d.
* Supplemental controls may be needed for complete control.		

Leafy Vegetables (Non-Brassica)

Such as arugula, celery, lettuces, rhubarb, and spinach

PEST	LBS/ACRE	RECOMMENDATIONS
Flea beetles, grasshoppers	12.5-25	Suppression only*. Use only in early season to avoid residue at harvest. Start prior to infestation. Apply every 3–5 days to maintain adequate coverage throughout infestation.
Sunburn and heat stress	12.5-25	See I d.
* Supplemental controls may be needed for complete control.		

Asparagus

PEST	LBS/ACRE	RECOMMENDATIONS
Common and spotted asparagus beetle, grasshoppers	12.5-25	Suppression only*. Start prior to infestation. Apply every 7–10 days being sure to maintain coverage throughout infestation.
Sunburn and heat stress	12.5-25	See I d.
* Supplemental controls may be needed for complete control.		

e. Other Agricultural Crops:

Volume: Apply to **near-drip**. Do not apply to run-off to avoid waste and poor coverage. The volume of water per acre required will increase throughout the growing season in relation to the increasing size of the crop and its foliage.

Concentration (the amount of Surround WP per 100 gallons of water): It is best to use 25 to 50 lbs Surround WP per 100 gallons of water.

Cotton

PEST	LBS/ACRE	RECOMMENDATIONS
Boll weevil, cotton fleahopper, flea beetles, grasshoppers, thrips	12.5-25	Suppression only*. Start prior to infestation. Spray every 7–14 days with the first two sprays 7 days apart.
Heat stress	25-100	See I d.
* Supplemental controls may be needed for complete control.		

Cereal Grains and Nongrass Animal Feeds

Such as corn, popcorn, oats, barley, wheat, rice, sorghum, and alfalfa

PEST	LBS/ACRE	RECOMMENDATIONS
Armyworm, flea beetles, grasshoppers, leafhoppers, thrips	12.5-37.5	Suppression only*. Start prior to infestation. Apply every 5–10 days during infestation, with the first two applications 3 days apart. Tighten spray intervals during fast growing periods.
Sunburn and heat stress	25-100	See I d.
* Supplemental controls may be needed for complete control.		

Tropical Crops

Such as coffee, avocado, banana, guava, mango, passion fruit, starfruit, papaya, and pineapple

PEST	LBS/ACRE	RECOMMENDATIONS
Avocado looper, coconut bug, fruit flies, grasshoppers, leafhoppers, leafrollers, mango weevil, thrips	25-50	Suppression only*. Start prior to infestation. Apply minimum of 2 applications 7–14 days apart during application.
Sunburn and heat stress	25-50	See I d. Aerial application is recommended for banana.
* Supplemental controls may be needed for complete control.		

Special Directions

Initial application over waxy surfaces such as mango fruit may bead and not spread adequately. See Engelhard supplemental labeling for further information on use of spreader/stickers.

Miscellaneous Crops

Such as artichoke, fig, hops, globe, kiwifruit, olives, okra, paw paw, peanut, persimmon, pomegranate¹, and water chestnut

PEST	LBS/ACRE	RECOMMENDATIONS
Flea beetles, fruit flies, grasshoppers, leafhoppers, olive fruit fly, thrips	12.5-50	Suppression only*. Start prior to infestation. Spray every 7–14 days throughout infestation.
Sunburn and heat stress	12.5-50	See I d.
¹ Applications should only be made to pomegranates during post-harvest.		
* Supplemental controls may be needed for complete control.		

f. Non-Food Crops:

Nursery and Ornamental Plants

Such as landscape plants, flowers, and garden transplants

PEST	LBS/ACRE	RECOMMENDATIONS
Black vine weevil, diabrotica beetle, grasshoppers, leafhoppers including sharpshooters, Japanese beetle, thrips	6.25-37.5	Suppression only*. Start prior to infestation. Spray every 5–7 days throughout infestation.
Deer, rabbit	6.25-37.5	Suppression only*. Start prior to animal feeding and maintain coverage during feeding period. For plants on which Surround WP does not adhere well, re-spray as soon as possible following rainfall or protection will be lost.
Sunburn and heat stress	6.25-37.5	See I d. Reduces transplant shock and heat stress when transplanting nursery stock to the field or garden. It is not an acceptable practice to dip transplants into Surround WP mix.
* Supplemental pest control methods may be needed to aid control.		

Special Directions

Flower and ornamental plants will obtain a white covering from applications of Surround WP. If this is undesirable do not spray. On cut-flower plants, it is best to spray only the leafy foliage of the plant, so that cuttings are not affected.

Christmas Trees

PEST	LBS/ACRE	RECOMMENDATIONS
Sunburn and heat stress	25-75	See I d. Recommendations are 25-50 lbs in 100 gallons of water. Spray 2 applications 14 days apart prior to heat event. See Engelhard supplemental labeling recommendations for stickers to enhance adherence. Stop sprays 30 days prior to harvest.

g. Greenhouse:

Edible and Non-Food Crops
Such as all crops listed on this label

PEST	LBS/ACRE	RECOMMENDATIONS
Pests as listed under specific crop groups on this label.	6.25-37.5	Suppression only*. Start prior to infestation. Spray every 5–7 days being sure to maintain coverage, especially on new growth. Exercise extra care to cover undersides of leaves when targeting pests that inhabit leaf undersides.
* Supplemental controls may be needed for complete control.		

III. STORAGE AND DISPOSAL

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

PESTICIDE STORAGE: Store in a dry, sheltered location {away from food or feed}. Product is slippery when wet. In case of spill or leak, avoid breathing dust, clean up and dispose of wastes in compliance with applicable Federal, State, and local regulations.

PESTICIDE DISPOSAL: Pesticide, spray mixture or rinsate that cannot be used according to label instructions must be disposed of according to applicable Federal, State, and local procedures.

CONTAINER DISPOSAL: Completely empty bag into application equipment. Dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of the smoke.

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