

# **CHEMIGATION APPLICATION ON HEAD LETTUCE, ENDIVE, ESCAROLE OR RADICCHIO - FINE TEXTURED SOILS**

## General Information

### PRODUCT INFORMATION

Willowood Pronamide 3.3SC is effective for the control of a wide range of grasses and certain broadleaf weeds. The product is a soil active herbicide with uptake by sensitive weeds occurring through the roots. Before using this herbicide for a specific crop use, study the following product use information that provides important instructions for the safe and effective application of the product.

Use Restrictions: Hand-spray applications of Willowood Pronamide 3.3SC may be made only to ornamentals and nursery stock of ornamentals.

Chemigation: Do not apply this product through any type of irrigation system except as specified on the label or in Willowood, LLC supplemental labeling.

### SPRAY DRIFT MANAGEMENT (AERIAL APPLICATION)

Avoiding spray drift at the application site is the responsibility of the applicator. The potential for spray drift is determined by the interaction of many equipment-and-weather-related factors. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

Where certain states have more stringent regulations, they must be observed.

The applicator must be familiar with and take into account the information covered in the following Aerial Drift Reduction Advisory Information section.

### Aerial Spray Drift Advisory Information

This section is advisory in nature and does not supersede mandatory label requirements.

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity and Temperature Inversion section of the label).

#### Controlling Droplet Size:

- Volume – Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- Pressure – Do not exceed the nozzle manufacturer’s specified pressures. Use the lower spray pressures specified for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- Number of Nozzles – Use the minimum number of nozzles that provide uniform coverage.
- Nozzle Orientation – Orienting nozzles so that the spray is released backwards, parallel to the airstream will produce larger droplets than other orientations. Significant deflection from the horizontal will reduce droplet size and increase drift potential.
- Nozzle Type – Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce larger droplets and lower drift than other nozzle types.

Boom Length: For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

**Application Height:** Do not make applications at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

**Swath Adjustment:** When applications are made with a cross-wind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Increase swath adjustment distance with increasing drift potential (higher wind, smaller drops, etc.).

**Wind:** Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Avoid application below 2 mph due to variable wind direction and high inversion potential. Note: Local terrain can influence wind patterns. Every applicator must be familiar with local wind patterns and how they affect spray drift.

**Temperature and Humidity:** When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

**Temperature Inversions:** Do not apply during a temperature inversion, because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. The cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. The presence of inversion conditions can be indicated by ground fog. However, if fog is not present, the movement of smoke from a ground source or an aircraft smoke generator can also identify inversion conditions. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upwards and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas: Apply this pesticide when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

## RESISTANCE MANAGEMENT

Willowood Pronamide 3.3SC is a Group 3 herbicide. Any weed population may contain or develop plants naturally resistant to this product and other Group 3 herbicides. The resistant biotypes may dominate the weed population if these herbicides are used repeatedly in the same field. Willowood Pronamide 3.3SC will not control known Group 3 resistant biotypes of labeled weeds. Other resistance mechanisms that are not linked to site of action, but specific for individual chemicals, such as enhanced metabolism, may also exist. Appropriate resistance management strategies should be followed.

To delay herbicide resistance consider:

- Where possible, rotate the use of Willowood Pronamide 3.3SC or other Group 3 herbicides with different herbicide groups that control the same weeds in a field.
- For best resistance management stewardship, avoid use more than once per season and use Willowood Pronamide 3.3SC in programs with other herbicides with different modes of action.
- Where possible, rotate the use of Willowood Pronamide 3.3SC or other Group 3 herbicides with different herbicide groups that control the same weeds in a field.
- Use tank mixtures with herbicides from a different group when such use is permitted.
- Herbicide use should be based upon an IPM program that includes scouting, historical information related to herbicide use and crop rotation, and considers tillage (or other mechanical), cultural, biological and other chemical control practices.
- Monitor treated weed populations for resistance development.
- Prevent movement of resistance weed seeds to other fields by cleaning harvesting and tillage equipment and planting clean seed.
- Contact your local extension specialist or certified crop advisers for any additional pesticide resistance management and/or integrated weed management requirements for specific crops and weed biotypes.

## DOSAGE

The rate of Willowood Pronamide 3.3SC required will vary depending on the crop culture involved and weed species to be controlled. See specific crop use directions for all dosage instructions. All dosage instructions listed in the label are in terms of pints of product or pounds of active ingredient per broadcast acre. For banded application, reduce the amount of Willowood Pronamide 3.3SC used per square acre according to the given formula.

## TIMING AND APPLICATION

Unless specific directions are given under the crop to be treated, apply Willowood Pronamide 3.3SC in the fall or early winter, when temperatures do not exceed 55°F, but prior to freeze-up. Best weed control results occur when Willowood Pronamide 3.3SC is applied preemergence to the weeds and when application is followed by rainfall or irrigation to move the product into the root zone of the germinating weeds.

Mix Willowood Pronamide 3.3SC thoroughly in clean water at the required concentration and apply uniformly as a spray.

For ground application, use a conventional low-pressure herbicide sprayer equipped with flat fan nozzles spaced and calibrated to uniformly deliver 20 to 50 gallons of spray per acre. For aerial applications, apply in a coarse droplet spray at 5 to 10 gallons per acre. Accurately calibrate spray equipment prior to each use.

## COMPATIBILITY WITH OTHER PESTICIDES

Willowood Pronamide 3.3SC is compatible with most commonly used agricultural pesticides, crop oil concentrate and adjuvants. When preparing tank mixes, consult spray compatibility charts or State Cooperative Extension Service Specialists prior to actual use. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use(s). Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

## EFFECT OF SOIL TYPE, MOISTURE AND TEMPERATURE

Willowood Pronamide 3.3SC is most active in coarse to medium texture soils of low organic matter and relatively inactive in peat or muck soils or mineral soils high in

organic matter content at rates specified in the label. Herbicidal activity is best in soils containing less than 4 percent organic matter. Use in soils with higher organic matter may result in inconsistent or incomplete weed control.

The herbicidal activity of Willowood Pronamide 3.3SC is mainly through root absorption in sensitive weed species. Rain, melting snow or irrigation is essential following treatment to move Willowood Pronamide 3.3SC into the root zone of germinating weeds.

Under field conditions, Willowood Pronamide 3.3SC will remain relatively stable with little loss of herbicidal activity when soil temperatures are less than 55°F. As soil temperatures increase, degradation of the active ingredient takes place.

Willowood Pronamide 3.3SC may degrade rather quickly if left exposed on the soil surface in warm weather. If Willowood Pronamide 3.3SC is applied when air temperature exceeds 85°F, the treatment must be soil incorporated to a shallow depth (top two to three inches) or watered into the soil as soon as possible.

## CULTURAL CONSIDERATIONS

For best results, apply Willowood Pronamide 3.3SC to a trash-free soil surface. Clean cultivation before application is preferable, but not necessary. To obtain optimum weed control in areas not clean cultivated, the area to be treated must be free of surface litter (dead or decaying crop and weed debris, mowing clippings, etc.). Trash-free areas create ideal conditions for rapid movement of Willowood Pronamide 3.3SC into the weed root zone following rain or irrigation.

## Limitations, Restrictions, and Exceptions

### HEAD AND LEAF LETTUCE/ENDIVE/ESCAROLE/RADICCHIO GREENS INCLUDING SINGLE APPLICATION AND SPLIT APPLICATION AND CHEMIGATION

#### Use Information

Willowood Pronamide 3.3SC is a selective herbicide for the control of certain annual grasses and broadleaf weeds in direct seeded or transplanted head or leaf lettuce, endive, escarole and radicchio greens.

## Chemigation Application (For Use in Arizona and California)

Apply Willowood Pronamide 3.3SC by chemigation for weed control in direct seeded or transplanted head or leaf lettuce, endive, escarole or radicchio greens but must be applied prior to weed emergence. Application may be made preemergence to head or leaf lettuce, endive, escarole, or radicchio greens or postemergence to head or leaf lettuce. Do not apply postemergence to endive, escarole, or radicchio greens.

### Split Chemigation Application:

Willowood Pronamide 3.3SC chemigation application can be split, so that part of the maximum allowable application rate of the product can be initially applied to head or leaf lettuce, endive, escarole or radicchio greens, and the balance of the maximum allowable application rate can be applied up to 10 days later. Total amount of Willowood Pronamide 3.3SC applied must not exceed 2.5 pints product (1 lb. active ingredient) per acre per crop season. For leaf lettuce, the total amount of Willowood Pronamide 3.3SC applied must not exceed 2.5 pints product (1 lb. active ingredient) per acre per crop, or more than 5 pints product (2 lbs. active ingredient) per acre per year.

**Application Moisture Requirements:** Willowood Pronamide 3.3SC acts mainly through root absorption; therefore, it is necessary to move Willowood Pronamide 3.3SC into the root zone of germinating weeds to provide effective control. This can be accomplished by applying a minimum of 0.75 inch of overhead sprinkler irrigation when applied by chemigation to fields that have been pre-irrigated.

**Time of Treatment:** Applying Willowood Pronamide 3.3SC following initial irrigation of the crop may help limit movement of the herbicide below the root zone of germinating weeds and may improve weed control. Depending on climatic conditions, chemigation generally should be within three to six days after the first post-plant irrigation. The following recommendations are provided as a general guideline for AZ and CA desert growing conditions. Optimal chemigation timing for other growing areas may differ from those listed below.

**Timing:** Early

**Date:** Sept. 1 to Oct. 15

Application Timing (Days After Starting Sprinklers): 1-3

Timing: Mid

Date: Oct. 15 to Dec. 15

Application Timing (Days After Starting Sprinklers): 3-6

Timing: Late

Date: Dec. 15 to Jan.

Application Timing (Days After Starting Sprinklers):5-6

Chemigation Equipment: Willowood Pronamide 3.3SC may be applied through center pivot, lateral move, solid set or hand move systems capable of uniform delivery of the herbicide. Solid set or hand move systems should be capable of delivering a uniform pressure of 60 to 70 psi at all nozzles. Pipes and nozzles must be positioned to provide uniform coverage of the treatment area. Placement of nozzles in a diamond shaped (◆) pattern will provide more uniform coverage.

Do not apply when wind velocity is sufficient to distort uniformity of coverage or cause drift to susceptible non-target plants.

The injection-metering pump must be calibrated as specified by the manufacturer and checked periodically during application to ensure proper operation. Pesticide injection hoses, which connect chemigation-metering equipment to the sprinkler irrigation system, must be of braided reinforced construction with an internal tube made of nylon, cross-linked polyethylene, or high-density polyethylene.

Mixing: Mixing tanks should be large enough to contain the entire amount of herbicide mixture for the area to be treated.

Use a minimum of 3 gallons of water per 1.2 pints of Willowood Pronamide 3.3SC. Agitation of the herbicide mixture is required at all times during mixing and application (injection).

Application: For hand move or solid set systems set up to deliver about 1/10 inch of water per hour, Willowood Pronamide 3.3SC should be injected over a period of 1 to 2 hours. Once the herbicide has been injected, continue irrigation for at least the time required to flush the system and deliver additional irrigation sufficient to incorporate the herbicide into the upper inch of soil.

Chemigation Use Restrictions for Head or Leaf Lettuce, Endive, Escarole or

## Radicchio Greens

- Do not apply Willowood Pronamide 3.3SC to direct seeded varieties of head lettuce, endive, escarole and radicchio greens that will be harvested less than 55 days after treatment or transplanted head lettuce that will be harvested less than 35 days after application.
- For use on leaf lettuce, follow the table below for preharvest intervals based on the appropriate use rate.

## Use Rate PHI

Up to 1.25 pts/A (0.5 lb. ai/A) - 25 days (PHI)

Up to 1.8 pts/A (0.75 lb. ai/A): 35 days (PHI)

Up to 2.5 pts/A (1.0 lb. ai/A): 45 days (PHI)

- Do not apply more than one application of Willowood Pronamide 3.3SC per crop to head or leaf lettuce, endive, escarole, or radicchio greens or more than two applications if split application is made.
- Do not apply Willowood Pronamide 3.3SC postemergence to endive, escarole, or radicchio greens.
- For head lettuce, endive, escarole, or radicchio greens, do not apply more than 1 lb./acre active ingredient (2.5 pts/acre of Willowood Pronamide 3.3SC) per crop.
- For leaf lettuce, do not apply more than 1 lb./acre active ingredient (2.5 pints./acre Willowood Pronamide 3.3SC) per crop, or more than 2 lbs. active ingredient (5 pints Willowood Pronamide 3.3SC) per acre per year.

## Chemigation Instructions

Do not apply this product through any irrigation system unless the instructions for chemigation are followed. Apply this product only through continuously moving center pivot, lateral move end tow, solid set, or hand move irrigation systems. 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 Service specialists, equipment manufacturers, or other experts.

Do not connect an irrigation system (including greenhouse system) used for pesticide application to a public water system unless the pesticide label-prescribed

safety devices for public water systems on the pesticide container label are in place.

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

1. Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system.
2. 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.
3. The pesticide injection pipeline must contain a functional automatic, quick closing check valve to prevent the flow of fluid back toward the injection pump.
4. 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.
5. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
6. 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.
7. 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.
8. Do not apply when wind speed favors drift beyond the area intended for treatment.

Method

[Surface](#)

Rates

[field rates 0](#)

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Restricted Entry Interval

24 hours

Soils

[Fine](#)

[Silty Clay Loam](#)

[Silty Clay](#)

[Sandy Clay](#)

[Clay Loam](#)

[Clay](#)

Timings

[Postemergence \(Crop\)](#)

[Preemergence \(Crop\)](#)

[Preemergence \(Weed\)](#)