

# **HORSERADISH - COARSE SOILS - GREATER THAN 3.0% ORGANIC MATTER**

## General Information

### HERBICIDE RESISTANCE

To help identify resistance issues, it is recommended to scout for weeds carefully before sulfentrazone application for identification and growth stage and after sulfentrazone application to look for poor performance or likely resistance.

Willowood Sulfentrazone 4SC must be applied at specified label rates according to the directions in this label. Do not apply Willowood Sulfentrazone 4SC at rates that are lower than the specified rates listed in this label. Apply Willowood Sulfentrazone 4SC when weeds are small.

If weed control is less than desirable, and cannot be attributed to error in application, abnormal height of weed species, or extreme weather conditions, it is possible that the target species is resistant to sulfentrazone applications. If weed resistance occurs, Willowood Sulfentrazone 4SC may not provide adequate control of target weeds. Contact your local extension specialists, certified crop advisors, and/or sulfentrazone registrants if you suspect that target weeds are resistant to sulfentrazone application.

Repeated application of this product or other products can cause weed resistance to occur. Contact your local State agricultural specialists for strategies to manage herbicide resistance. To avoid weed resistance, apply Willowood Sulfentrazone 4SC in rotation with products that have a different mode of action and other classes of chemistry.

### PRODUCT INFORMATION

Willowood Sulfentrazone 4SC is a soil-applied selective herbicide that controls specific grasses, sedges, and broadleaf weeds. Sulfentrazone, the active ingredient in this product, inhibits a plant enzyme that is required for producing chlorophyll. Disabling this enzyme causes the release of singlet oxygen (O) which disrupts cellular membranes, causing cell leakage and cell death, which ultimately results in weed death.

### PROPER HANDLING INSTRUCTIONS

Do not mix or load Willowood Sulfentrazone 4SC within 50 feet of any well, including

abandoned wells, drainage wells, sink holes, perennial or intermittent streams and rivers, and natural or impounded lakes and reservoirs. This setback does not apply to properly capped or plugged wells and does not apply to impervious pads or properly diked mixing/loading areas.

Operations that involve mixing, loading, rinsing, or washing to Willowood Sulfentrazone 4SC into or from pesticide handling or application equipment or container within 50 feet of any well are prohibited unless conducted on an impervious pad constructed to withstand the weight of the heaviest load that may be positioned on or moved across the pad. Such a pad shall be designed and maintained to contain any product spills or equipment leaks, container or equipment rinse, or washwater and rainwater that may fall on the pad. Surface water shall not be allowed to either flow over or from the pad, which means the pad must be self-contained. The pad shall be sloped to facilitate material removal. An unroofed pad shall be of sufficient capacity to contain a minimum of 110% of the capacity of the largest pesticide container or application equipment on the pad. A pad that is covered by a roof of sufficient size to completely excluded precipitation from contact with the pad shall have a minimum containment capacity of 100% of the capacity of the largest pesticide container or application equipment on the pad. Containment capacities as described above shall be maintained at all times. The above specific minimum containment capacities do not apply to vehicles when delivering pesticide shipments to the mixing/loading site. States may have in effect additional requirements regarding wellhead setbacks and operational containment. Do not apply this product through any type of irrigation system. Do not use flood irrigation to apply or incorporate this product.

Willowood Sulfentrazone 4SC must be used in a manner which will prevent back siphoning in wells, spills, or improper disposal of excess pesticide, spray mixtures or rinsates.

#### APPLICATION INSTRUCTIONS

See the crop specific instructions below for additional use precautions/restrictions. Apply Willowood Sulfentrazone 4SC as a surface application, pre-emergence treatment before crop/weed emergence, or incorporate Willowood Sulfentrazone 4SC into the soil prior to planting. Willowood Sulfentrazone 4SC can also be applied post-plant application, over-the-top, and layby.

#### Incorporated Treatment Prior to Planting

Willowood Sulfentrazone 4SC must be incorporated using a uniform surface

application to a maximum depth of 2”.

Reduced control will occur if incorporated to a depth greater than 2”. Be careful to ensure that there is no overlap between treated areas due to soil movement, or crop injury may occur.

#### Soil Applied/Post-Plant Treatments

Willowood Sulfentrazone 4SC must be activated by moisture if making soil/post-plant treatments. The amount of moisture required depends on the soil type, amount of organic matter present, tillage, and existing soil moisture.

0.5-1.0” of irrigation or rainfall is required 7-10 days post-application. If 0.5-1.0” of moisture is not obtained, incorporate in shallow soil to obtain adequate control of target species. Moisture activation can be delayed for 10-14 days depending on soil type, amount of organic matter present, tillage, and existing soil moisture. If moisture activation is delayed, control may be reduced.

Willowood Sulfentrazone 4SC will control listed weed species when activated. The level of control depends on the size and type of weed species. Control of listed germinating weeds will be reduced when rain or irrigation follows a period of dry weather.

Apply Willowood Sulfentrazone 4SC prior to the germination of crop seeds in order to avoid damage to emerging seedlings.

Crop injury can occur if treatment is delayed, seeds are germinating, and are close to the soil surface.

#### Surface Applications

If activation has not been triggered by rainfall or irrigation within 10 days of treatment, make a shallow incorporated treatment (<2”) in order to control germinating weed species. Soil incorporation will facilitate Willowood Sulfentrazone 4SC activation with existing soil moisture.

If there are drought conditions or prolonged periods when rain/irrigation is not possible, do not use Willowood Sulfentrazone 4SC, and consider another weed control method.

Post-Plant Treatments must be made precisely according to crop specific directions. Lay-by/Over-the-Top applications control listed weed species through contact and residual control (depending on weed species).

Surfactant use can improve weed control and/or increase the likelihood of crop injury.

Certain crops will respond differently to Willowood Sulfentrazone 4SC applications

depending on use rate, specific crop species sensitivity, and the composition of the soil.

Seedlings and germinating seeds absorb Willowood Sulfentrazone 4SC from the soil solution. The amount of active ingredient present in the soil depends on the soil type, pH, and the amount of organic matter present.

Willowood Sulfentrazone 4SC is absorbed by organic matter and clay parts of soils. This absorption reduces the amount of active ingredient available for weed uptake. Clay content in soil tends to increase as the soil gets finer. Crop use directions are indicated per soil types.

The amount of organic matter in soils varies within soil classifications. A detailed soil analysis is required to make an accurate assessment of the amount of organic matter in the soil.

The amount of sulfentrazone available for weed uptake increases as the soil pH increases. Take soil samples to accurately determine soil pH. The use of alkaline water will increase the amount of available sulfentrazone for weed uptake.

However, if irrigation water pH is  $>7.5$  crop injury can occur. The likelihood of crop injury due to high soil pH decreases as the plant grows.

Use rates for Willowood Sulfentrazone 4SC are determined by the timing of application, the amount of activating moisture (rainfall/irrigation), soil characteristics, and soil pH.

Crop specific use rates for each crop are based on soil type, amount of organic matter in soil, and soil/pH interaction.

#### Aerial Application Instructions

Apply Willowood Sulfentrazone 4SC with appropriate nozzles that provide optimal coverage and minimize drift and keep fine droplets to a minimum. Apply Willowood Sulfentrazone 4SC in a volume that is appropriate to provide sufficient coverage. Use a minimum spray volume of 5 gallons per acre. Do not apply Willowood Sulfentrazone 4SC when wind speed is likely to cause the product to drift outside the target area.

#### Aerial Application Restrictions

- Aerial application is allowed only when environmental conditions prohibit ground application. Aerial application will be allowed when the field is too wet to safely apply pesticides using ground equipment.
- When this product is allowed to be applied by air, applicator must use a minimum finished spray volume of 5 gallons per acre.

- The maximum release height must be 10 feet from the top of the crop canopy, unless a greater application height is required for pilot safety.

#### Ground Application Instructions

Apply Willowood Sulfentrazone 4SC with a boom and nozzle sprayer that contains the appropriate spray tips, screens, and nozzles. Calibrate application equipment for optimal coverage and spray distribution at the appropriate pressure.

Use spray nozzles designed to minimize drift and keep fine spray droplets to a minimum. Apply Willowood Sulfentrazone 4SC in a minimum spray volume of 10 gallons per acre. Overlapping treatment areas can injure crops. When starting, turning or stopping, slower ground speed of the application equipment can lead to crop injury. Do not apply Willowood Sulfentrazone 4SC when wind speed is likely to cause the product to drift outside the target area.

#### CALIFORNIA SPECIFIC RESTRICTIONS

Runoff Groundwater Protection Areas: Do not apply Willowood Sulfentrazone 4SC in areas defined by the California Department of Pesticide Regulation as being “runoff groundwater protection areas\*” unless one of the following management practices can be met:

- 1) Soil disturbance: The treated soil is distributed within 7 days of application using a disc, harrow, rotary tiller or other mechanical device. This subsection does not apply to the area to be treated that is immediately adjacent to the crop row and that does not exceed 33% of the distance between crop row or in citrus, to the band from the tree row to the dripline; or
- 2) Pesticide incorporation: The pesticide shall be incorporated on 90% of the area treated within 48 hours of application using disc, harrow, rotary tiller or other mechanical device, or by sprinkler/low-flow irrigation (including chemigation where allowed by the label), using ¼”-1” irrigation water as described in the application instructions, at application rates that do not cause surface water runoff from the treated property or to wells on the treated property; or
- 3) Band treatment: This product is applied as a band treatment immediately adjacent to the crop row so that no more than 33% of the distance between rows is treated, or, in citrus, not more than the area from the tree row to the dripline is treated; or
- 4) Timing of application: This product is applied between April 1st, and July 31st; or
- 5) Retention of runoff on field: For 6 months post-application, the field shall be designed to retain all irrigation runoff and all precipitation on, and drainage through the field by berms, levees, or non-draining circulation systems. The retention area

on the field shall not have a percolation rate of more than 0.2"/hour (5"/24 hours); or  
6) Retention of runoff in a holding area off the field: For 6 months post-application, all runoff shall be channeled to a holding area off of the application site, under the control of the property owner, that is designed to retain all irrigation runoff and all precipitation on, and drainage through, the treated field and all other areas draining onto that holding area. The holding area shall not have a percolation rate of more than 0.2"/hour (5"/24 hours); or

7) Runoff onto a fallow field: For 6 months post-application, runoff shall be managed so that it runs off onto an adjacent unenclosed fallow field at least 300 feet long that is not irrigated for 6 months after application, with the exception of the addition of adequate moisture that is required for herbicidal activation following application as described under Application Instructions, with full consideration of any plant back restrictions.

#### Leaching Ground Water Protection Areas

Do not use in areas designed by the California Department of Pesticide Regulation as leaching ground water protection areas\* unless either:

- 1) The user does not apply any irrigation water for 6 months following the application of this product; or
- 2) The user applies this product to the planting bed or the berm above the level of irrigation water in the furrow or basin and the water level shall remain at or below that level for 6 months following application of the pesticide with the exception of the addition of adequate moisture that is required for herbicidal activation following application as described under Application Instructions; or
- 3) Irrigation is managed so that the ratio of the amount of irrigation water applied divided by the net irrigation requirement is 1.25 or less for 6 months following application of this product.

\*Consult with your County Agricultural Commissioner to determine whether the application will be within an area designated by the California Department of Pesticide Regulation as either a Runoff Ground Water Protection Area or a Leaching Ground Water Protection Area. Details regarding the locations of these areas are also available via the internet at [www.cdpr.ca.gov/docs/emon/grndwtr/gwp.regs.htm](http://www.cdpr.ca.gov/docs/emon/grndwtr/gwp.regs.htm)

#### Application in Combination with Dry Fertilizers

Willowood Sulfentrazone 4SC can be impregnated with and applied in conjunction with a dry bulk fertilizer. Apply Willowood Sulfentrazone 4SC and dry bulk fertilizer with ground application equipment. Do not make aerial applications of Willowood

Sulfentrazone 4SC in combination with dry bulk fertilizer. Follow state regulations in the preparation of Willowood Sulfentrazone 4SC/fertilizer combinations, including mixture preparation, storage, transportation, selling, and treatment.

#### Directions for Dry Bulk Fertilizer Impregnation

Use the following method for impregnation:

1. Ensure that spray nozzles are calibrated and positioned for uniform Willowood Sulfentrazone 4SC coverage of the dry fertilizer during the mixture process.
2. Make a slurry with Willowood Sulfentrazone 4SC and water in a clean container.
3. Once made, add the Willowood Sulfentrazone 4SC/water slurry to the impregnation spray tank.
4. Finish the solution by adding water as required.

Use a dry bulk fertilizer blender such as a closed rotary-drum mixer that is fitted with appropriate spray application equipment. See the Cleaning Application Equipment section below prior to cleaning equipment used for impregnation, transportation, loading, and application of the Willowood Sulfentrazone 4SC/dry fertilizer combination. Do not attempt to impregnate coated ammonium nitrate or limestone with Willowood Sulfentrazone 4SC as neither can absorb the herbicide.

#### Application Instructions for Willowood Sulfentrazone 4SC Impregnated Dry Fertilizers

Dry fertilizer impregnated with Willowood Sulfentrazone 4SC must be applied using a dry fertilizer spreader. The application equipment must be correctly calibrated for sufficient and uniform coverage of the soil surface. If treatment is not uniform, some areas may go untreated which may cause reduced control of target species. Avoid overlapping applications, which may cause labeled use rates to be exceeded, and may cause adverse crop response. Apply the dry fertilizer/Willowood Sulfentrazone 4SC combination at a rate of 200 lbs. impregnated dry bulk fertilizer per acre in order to provide sufficient soil coverage. See the specific crop use instructions for the specified rate of Willowood Sulfentrazone 4SC per acre.

#### Application in Combination with Liquid Fertilizers

When applied in combination with a liquid fertilizer, Willowood Sulfentrazone 4SC will control listed weeds. Sufficient soil coverage is critical to control target weeds. Fertilizer solutions that are used as a carrier for Willowood Sulfentrazone 4SC may be concentrated formulations as blended or diluted in water.

#### Use Directions for Liquid Fertilizer Combination

- The selected spray system must have the spray capacity to allow uniform

application of the treatment solution, and must be capable of maintaining agitation in the spray tank throughout the mixture and application procedures.

- Some spray application systems might need separate pumps to apply the solution and maintain agitation at the same time.

- Prior to combining the liquid fertilizer and Willowood Sulfentrazone 4SC in the application tank, carry out a glass jar (1 quart size), add all mix partners, in their relative proportions. Invert, shake, or mix the jar thoroughly. If mixture forms precipitates (flakes or sludge), gels, balls up or forms oily films or layers, this indicates incompatibility. Though signs of incompatibility will typically be seen within 5 minutes of mixing, mixture should be observed for approximately 30 minutes).

- Combine Willowood Sulfentrazone 4SC and the carrier liquid fertilizer as follows:

1. Fill a clean spray tank  $\frac{1}{2}$  full of fertilizer solution.
2. Begin agitation of the fertilizer solution.
3. Use a clean container to create a slurry of Willowood Sulfentrazone 4SC and water (equal parts of both)\*.
4. Add the slurry slowly to the spray tank, continuing agitation throughout.
5. Rinse the slurry mix container and add rinsate solution to spray tank.
6. Finish filling spray tank to required level.
7. Maintain agitation throughout. The Willowood Sulfentrazone 4SC/water slurry must be mixed thoroughly prior to application.

\*For best mixing of the Willowood Sulfentrazone 4SC/water slurry, add the slurry using induction systems on the spray fill plumbing system.

Read and follow the label of each tank mix product used for precautionary statements, directions for use, rates, timings, and other restrictions.

Application Instructions for Willowood Sulfentrazone 4SC Mixed with Liquid Fertilizers

- The spray application solution must be applied immediately following preparation.
- Maintain agitation throughout mixture and application.
- Do not store spray solution in the spray tank for an extended period of time, or overnight.
- A combination of Willowood Sulfentrazone 4SC and liquid fertilizer must not be premixed in nurse tanks.
- Applicators/sellers of liquid fertilizer must follow state regulations for liquid fertilizers, including those regarding preparation, blending, registration, transportation, selling, treatment, and storage.

Band Treatment Applications



Willowood Sulfentrazone 4SC can be applied as a banded treatment application.

## Limitations, Restrictions, and Exceptions

### HORSERADISH

#### Application Timing

- Apply pre-plant in the fall before the growing season.
- Apply in the spring early (pre-plant, pre-Emergence, pre-plant incorporated).
- Early pre-plant applications can only be made in the states of CO, ID, MI, MN, MT, NE, ND, OR, SD, WA, WI, or WY.

#### Important

- Read and follow all precautions, instructions, rotation crop guidelines, replanting instructions, and any other information listed on this label prior to use.
- Consult with university or extension weed management specialists for information on using Willowood Sulfentrazone 4SC with specific local varieties or cultivars of horseradish.
- Moisture (rain or snow) should occur after application to move the product into the soil.

#### Application Instructions

- Apply Willowood Sulfentrazone 4SC to stubble or soil surface.
- If applying pre-plant in the spring, apply Willowood Sulfentrazone 4SC 60 days prior to planting up to planting.
- If making pre-emergence applications before planting, and up to 5 days before crop emergence can be broadcast or banded.
- If applying after crop emergence, apply Willowood Sulfentrazone 4SC to row middles as a banded treatment.
- Use higher rates within the specified rate range if soil is clay or has >1% organic matter.
- If applying pre-plant incorporated in the spring, prior to planting, mix thoroughly or shallowly incorporate Willowood Sulfentrazone 4SC into the soil.
- Use rate is inversely dependent upon soil pH - use higher rates within the specified rate range with lower soil pH (<7.0) and lower rates within the specified rate range with higher soil pH (>7.0).

#### Application Restrictions

- Do not incorporate into the soil deeper than 2".

- Do not apply Willowood Sulfentrazone 4SC to frozen or snow-covered soil.
- Do not apply more than 8.0 fl. oz. product per acre (0.25 lb. AI/A) per year (12-month period from when Willowood Sulfentrazone 4SC is first applied).
- Do not use on soils classified as "sand" (with <1% organic matter).
- Do not apply Willowood Sulfentrazone 4SC if seedlings are close to soil surface or have emerged (apply a banded treatment to row middles).

#### Method

[Broadcast/Foliar Air](#)

[Broadcast/Foliar Ground](#)

[Band application](#)

[Soil incorporation](#)

[Broadcast/Foliar Air](#)

[Broadcast/Foliar Ground](#)

[Band application](#)

[Soil incorporation](#)

[Broadcast/Foliar Air](#)

[Broadcast/Foliar Ground](#)

[Band application](#)

[Soil incorporation](#)

#### Rates

[field rates 0](#)

- 

#### Restricted Entry Interval

12 hours

#### Soils

[Coarse](#)

[Loamy Sand](#)

[Sandy Loam](#)

[Sand](#)

#### Timings

[Preemergence \(Crop\)](#)

[Preplant](#)

[Preplant Incorporated](#)