6.7500

SULFENTRAZONE GROUP 14 HERBICIDE

ZONE 4F

ACTIVE INGREDIENTS:	**(% by weight)**
Sulfentrazone	39.6%
OTHER INGREDIENTS:	60.4%
TOTAL:	100.0%

*Contains 4 lbs. Sulfentrazone per gallon

EPA Reg. No. 74530-63

KEEP OUT OF REACH OF CHILDREN

CAUTION

See label booklet for First Aid, additrional Precautionary Statements and Directions for Use

Manufactured For
HELM Agro US, Inc.
401 E. Jackson St., Suite 1400
Tampa, FL 33602
Phone: 813.621.8846
Fax: 813.621.0763

FIRST AID	
If Swallowed	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • DO NOT induce vomiting unless told to do so by the poison control center or doctor. • DO NOT give anything by mouth to an unconscious person.
If Inhaled	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
If on Skin or Clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If 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.
HOT LINE: Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For Chemical Emergency Assistance (Spill, Leak, Fire or Accident) call CHEMTREC at 1-800-424-9300.	
NOTE TO PHYSICIAN: ZONE 4F herbicide is expected to have low oral and dermal toxicity, and moderate inhalation toxicity. It is expected to be slightly irritating to the skin and minimally irritating to the eyes. Treatment is otherwise controlled removal of exposure followed by symptomatic and supportive care.	

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION. Harmful if swallowed, inhaled or absorbed through skin. Causes moderate eye irritation. DO NOT breathe vapor or spray mist. DO NOT get on skin, in eyes or on clothing.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and Other Handlers Must Wear: A long-sleeved shirt & long pants; chemical-resistant gloves (Barrier laminate, Butyl rubber > 14 mils, Nitrile rubber > 14 mils, Neoprene rubber > 14 mils, Natural rubber > 14 mils, Polyvinyl chloride >14 mils or Viton > 14 mils), when mixing and loading and also when using hand-held equipment; and shoes plus socks.

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

Remove and wash contaminated clothing before reuse. If clothing and other absorbent materials have been drenched or heavily contaminated with this product DISCARD and **DO NOT** reuse them.

USER SAFETY RECOMMENDATIONS

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

ENVIRONMENTAL HAZARDS

This pesticide is toxic to marine /estuarine invertebrates. **DO NOT** apply directly to water or to areas where surface water is present or to intertidal areas below the mean high water mark. Drift and runoff may be hazardous to terrestrial and aquatic plants adjacent to treated areas. **DO NOT** contaminate water when disposing of equipment washwaters or rinsate.

DO NOT use on coarse soils classified as sand, which have less than 1% organic matter.

Surface water advisory:

ZONE 4F herbicide can contaminate surface water through spray drift and under some conditions, may have a high potential for runoff into surface water (primarily via dissolution in runoff water), for several to many months post-application. Areas prone to contamination include:
- Poorly draining or wet soils with readily visible slopes toward adjacent surface waters
- Frequently flooded areas
- Areas overlying extremely shallow groundwater
- Areas with in-field canals or ditches that drain to surface water
- Areas not separated from adjacent surface waters with vegetated filter strips
- Areas over-lying tile drainage systems that drain to surface waters.

Groundwater advisory:

ZONE 4F herbicide is known to leach through soil into groundwater under certain conditions as a result of label use. Use in areas where soils are permeable, especially where the water table is shallow, may result in groundwater contamination.

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CALIFORNIA ONLY SPECIFIC RESTRICTIONS ON APPLICATIONS OF ZONE 4F herbicide

Runoff Groundwater Protection Areas

DO NOT use in areas identified by the California Department of Pesticide Regulation as a runoff groundwater protection areas* unless one of the following management practices can be met:

1) **Soil disturbance.** Within 7 days before this product is applied, the soil to be treated shall be disturbed by using a disc, harrow, rotary tiller, or other mechanical method. This subsection does not apply to the area treated that is immediately adjacent to the crop row and that does not exceed 33% of the distance between crop rows or, in citrus, to the band from the tree row to the dripline; or

2) **Incorporation of the pesticide.** Incorporate within **48 hours** after the day this product is applied on at least 90% of the area treated, using a disc, harrow, rotary tiller or other mechanical method, or by sprinkler or low flow irrigation, including chemigation where allowed by the label, using a minimum of ¼ inch of irrigation water and a maximum of one inch as described under general product 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 not 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 April1 and July 31; or

5) **Retention of runoff on field.** Retain all irrigation runoff and all precipitation on, and drainage through the field for **six months** following the application. The field shall be designed, by berms, leeves, or non-draining circulation systems. The retention area on the field shall not have a percolation rate of more than 0.2 inches per hour (5 inches per 24 hours); or

6) **Retention of runoff in a holding area off the field.** For **six months** following the applications, all runoff shall be channeled to a holding area off the application site, under the control of the property operator, that is designed to retain all irrigation runoff and all precipitation on, and drainage through, the treated field and all other areas draining into that holding area. The holding area shall not have a percolation rate of more than 0.2 inches per hour (5 inches per 24 hours); or

7) **Runoff unto a fallow field.** For following application, run off shall be managed so that it runs off unto an adjacent unenclosed fallow field at least 300 feet long that is not irrigated for six months after the application with the exception of the additional of adequate moisture that is required for herbicidal activation following application as described under the product application instructions, with full consideration of any plant-back restrictions.

Leaching Ground Water Protection Areas

DO NOT use in areas designated 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 six months following 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 six months following the application of the pesticide with the exception of the additional of adequate moisture that is required for herbicidal activation following application as described under the product 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 six 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 locations of these Areas are also available via the internet at www.cdpr.ca.gov/docs/emon/grndwtr/gwp_regs.htm

CHEMICAL/PHYSICAL HAZARDS

DO NOT store or use near heat or open flame.

DIRECTIONS FOR USE

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

DO NOT apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

This product may only be used to control weeds listed on this label in use sites on this label.

DO NOT apply more than the labeled amount of ZONE 4F herbicide per acre per twelve-month period as stated in this label. The twelve-month period begins at the time of initial ZONE 4F herbicide application.

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 12 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.

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 over long-sleeved shirt and long pants
- chemical-resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride.
- shoes plus socks.

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NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to the uses of this product that are NOT within the scope of the Worker Protection Standard (WPS) 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.

Re-entry Statement: Do not allow people (other than the applicator) or pets on treatment area during application. Do not enter treatment area until spray has dried.

RESISTANCE MANAGEMENT

The development of herbicide resistance is well understood, however it is not easily predicted. When herbicides that affect the same biological site of action are used repeatedly over several years to control the same weed species in the same field, naturally-occurring resistant biotypes may survive a correctly applied herbicide treatment, propagate, and become dominant in that field. Adequate control of these resistant weed biotypes cannot be expected. If weed control is unsatisfactory, it may be necessary to retreat the problem area using a product affecting a different site of action.

Herbicides should be used in conjunction with the resistance management strategies in the area to better manage herbicide resistance through delaying the proliferation and possible dominance of herbicide resistant weed biotypes. It may be necessary to change cultural practices within and between crop seasons such as using a combination of tillage, retreatment, tank-mix partners and/or sequential herbicide applications that have a different site of action. Weed escapes that are allowed to go to seed will promote the spread of resistant biotypes. It is advisable to keep accurate records of pesticides applied to individual fields to help obtain information on the spread and dispersal of resistant biotypes. Consult your agricultural dealer, consultant, applicator, and/or appropriate state agricultural extension service representative for specific alternative cultural practices or herbicide recommendations available in your area.

If herbicide resistance should develop in the area to Group 14 Herbicides, this product used alone may not continue to provide sufficient levels of weed control. If the reduced levels of control cannot be attributed to improper application techniques, improper use rates, improper application timing, unfavorable weather conditions or abnormally high weed pressure, a resistant strain of weeds may have developed. To reduce the potential for weed resistance use this product in a rotation program with other classes of chemistry and modes of action.

Always apply this product at the recommended rates and in accordance with the use directions. **DO NOT** use less than recommended label rates alone or in tank mixtures. **DO NOT** use reduced rates of the tank mix partner. For optimum performance, scout fields carefully before sulfentrazone application for weed identification and growth stage. Begin applications before weeds emerge or when weeds are small. It is recommended that fields be scouted after sulfentrazone application to look for poor performance or possible resistance. If resistance is suspected, report herbicide failure to local extension specialists, certified crop advisors, and/or sulfentrazone registrants.

Mode of Action

The active ingredient in ZONE 4F herbicide is a potent inhibitor of the enzyme Protoporpyrinogen Oxidase IX (PPO IX) which is essential for the formation of chlorophyll. Inhibition of PPO IX enzyme results in the liberation of singlet oxygen (O) that, in turn, disrupts cellular membranes and causes cellular injury and leakage. The ultimate manifestation of the process is cell death leading to plant death. The selective herbicidal activity of ZONE 4F herbicide is based on its greater affinity for the PPO IX enzyme in weed species versus crop plants.

Mechanism of Action

Following the application of ZONE 4F herbicide to soil, germinating seeds and seedlings take up ZONE 4F herbicide from the soil solution. The amount of ZONE 4F herbicide in soil solution, and available for weed uptake, is determined primarily by soil type, organic matter and soil pH. See information in Application Instruction section for more details on soil type and pH effects.

INSTRUCTIONS AND INFORMATION

PRODUCT INFORMATION

ZONE 4F herbicide is a liquid flowable formulation. The product is a selective, soil-applied herbicide for the control of numerous susceptible broadleaf, grass and sedge weeds formulated as a 4 pounds per gallon flowable containing the active ingredient, sulfentrazone. Adequate rainfall/irrigation (1/2" to 1") is required for activation of ZONE 4F herbicide. If adequate moisture is not received within 7 to 10 days after the ZONE 4F herbicide treatment, a shallow incorporation may be needed to obtain desired weed control. When activating moisture is received after dry conditions, ZONE 4F herbicide will provide a reduced level of control of susceptible germinating weeds. Soil applications of ZONE 4F herbicide must be made before crop seed germination to prevent injury to the emerging crop seedlings. When applications after planting are delayed, injury may occur if seeds are germinating or if they are located near the soil surface.

Observe all instructions, crop restrictions, mixing directions, application precautions, replanting directions, rotational crop guidelines and other label information of each product when tank mixing with ZONE 4F herbicide. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

MIXING AND APPLICATION GUIDELINES

SPRAY VOLUMES

Ground Application:

- Optimize spray distribution and coverage by utilizing properly calibrated sprayer equipped with appropriate nozzles, spray tips and screens.
- Adjust spray pressures to recommendations that are appropriate for the nozzle type being utilized.
- Sprayer and spray nozzles should be set to minimize the risk of fine droplets, yet achieve adequate coverage of soil or foliage coverage.
- Use nozzles that require screens no finer than 50 mesh.
- Use 10 to 40 gallons of water per acre.

When tank mixed with a contact burndown herbicide, ground applicators must use a minimum spray volume of 15 gallons per acre.

- Continuous agitation in the spray tank is required to keep the product in suspension.
- Avoid overlap and shut off spray booms while starting, turning, slowing or stopping, as injury to the crop may result.

Aerial Application:

- Aerial application is allowed only when environmental conditions prohibit ground application.
- ZONE 4F herbicide may be applied by air using properly calibrated nozzle types and arrangements that will provide optimum coverage while producing minimal amounts of fine droplets.

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For aerial applications, 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.

- Apply sufficient spray volume to achieve adequate coverage.
- Apply a minimum of five (5) gallons of finished spray per acre.
- **DO NOT** apply when wind speed favors drift beyond the area intended for treatment.
- Continuous agitation in the spray tank is required to keep the product in suspension.
- Avoid overlap, as injury to the crop may result.

Chemigation Application:

- ZONE 4F herbicide may be applied using sprinkler irrigation systems. Acceptable sprinkler irrigation systems include center pivot, lateral move, end tow, solid set or hand move irrigation.
- **DO NOT** apply this product through any other type of irrigation system.
- **DO NOT** connect any irrigation system (including greenhouse systems) used for pesticide application to a public water system.
- Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from non-uniform distribution of treated water. If you have questions about calibration, you should contact State Extension Service specialists, equipment manufacturers, or other experts.
- 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.

IMPORTANT NOTE: Chemigation/Irrigation with highly alkaline water (high pH) following a ZONE 4F herbicide soil application can also significantly increase the amount of ZONE 4F herbicide available in soil solution. Irrigation with water having a pH greater than 7.5 may result in adverse crop response. Crop response will depend on initial product application rate, application timing, amount and pH of the irrigation water as well as the sensitivity of the crop and the growth stage when irrigated. The risk of adverse crop response will lessen with advancing growth stages of most crops.

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 backflow. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump. 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. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops. 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 where pesticide distribution is adversely affected. 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.

ZONE 4F herbicide should be metered into the irrigation system continuously for the duration of the water application. ZONE 4F herbicide should be diluted in sufficient volume to insure accurate application over the area to be treated. Use the appropriate amount of water to carry the product to the soil surface. **Continuous agitation** is required to maintain product suspension in the solution tank. A jar test should be conducted to ensure that phase separation would not occur during dilution and application. Failure to achieve a uniform dilution throughout the time of application may result in undesirable residues or less than desirable weed control. Flush the lines at the completion of the application and then turn the water off.

When using water from public water systems; **DO NOT** APPLY ZONE 4F herbicide through any irrigation system **PHYSICALLY CONNECTED** to a public water system. Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days of the year. ZONE 4F herbicide may be applied through irrigation systems, which may be supplied by a public water system only if water from the water system is discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and to top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe. Before beginning chemigation, always make sure that the air gap exists and that there is no blockage of the overflow of the reservoir tank.

DO NOT apply when wind speed favors drift beyond the area intended for treatment.

Application with Fertilizer:

ZONE 4F herbicide may be applied impregnated on dry fertilizers or with liquid fertilizer solutions by following the instructions below.

Impregnated Dry Fertilizer Application (Ground Application Only): ZONE 4F herbicide may be applied impregnated on dry fertilizers. ZONE 4F herbicide impregnated on dry fertilizer will provide satisfactory weed control when applied as directed with adequate soil coverage.

Follow all ZONE 4F herbicide label directions regarding product use rates per acre, registered crops, incorporation, special instructions and precautions. All individual state regulations relating to dry bulk fertilizer blending, registration, labeling, and application are the responsibility of the individual and/or company preparing, storing, transporting, selling or applying the ZONE 4F herbicide dry fertilizer mixture.

Impregnation Directions

Impregnate this product on dry bulk fertilizer, using a closed rotary-drum mixer or other commonly used dry bulk fertilizer blender equipped with suitable spray equipment. Pre-slurry this product in a clean container using clear water. Slowly add the ZONE 4F herbicide water slurry to the impregnation spray tank and finish filling as needed with clear water. Place spray nozzles in an appropriate arrangement that will provide uniform coverage of ZONE 4F herbicide onto the fertilizer during mixing.

Refer to the SPRAYER EQUIPMENT CLEAN-OUT section for directions for cleaning impregnation equipment, transport equipment, loading equipment and application equipment.

Apply the ZONE 4F herbicide dry bulk fertilizer mixture with an accurately calibrated dry fertilizer spreader. The mixture must be spread uniformly on the soil surface. Uneven spreading leaving untreated areas will cause poor weed control or overlapping areas with potential increased ZONE 4F herbicide use rates could result in possible crop damage. A minimum of 200 pounds of dry bulk fertilizer impregnated with the recommended amount of this product must be applied per acre to achieve adequate soil coverage for satisfactory weed control.

DO NOT impregnate ZONE 4F herbicide onto coated ammonium nitrate or limestone because these materials will not absorb the herbicide. Refer to the crop section of the ZONE 4F herbicide label to determine the rate of this product to be applied per acre. Use the following table to determine the amount of product to be impregnated on a ton (2,000 pounds) of dry bulk fertilizer based on the rate of fertilizer that will be applied per acre.

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Dry Fertilizer Rate (lbs/acre)	Ounces ZONE 4F herbicide per ton of fertilizer		
	ZONE 4F herbicide Use Rate Per Acre		
	8.0 Fluid Ounces per Acre	10.1 Fluid Ounces per Acre	12.0 Fluid Ounces per Acre
200	80	101	120
250	64	80.8	96
300	53.3	67.3	80
350	45.7	57.7	68.6
400	40	50.5	60
450	35.6	44.9	53.3

For rates not listed in the table above, calculate the amount of ZONE 4F herbicide to be impregnated on a ton of dry bulk fertilizer using the following formula:

$$\frac{2000}{\text{Pounds of dry fertilizer}} \times \text{ZONE 4F herbicide use rate in fluid ounces per acre} = \text{Ounces of ZONE 4F herbicide to be applied per ton of fertilizer}$$

Liquid Fertilizer Solution Application (Ground Application Only): ZONE 4F herbicide may be applied using liquid fertilizer solutions as the carrier. Fertilizer solutions may either be concentrate formulations as blended or diluted with water. When applied in fertilizer solution mixtures as directed with adequate soil coverage, ZONE 4F herbicide will provide satisfactory weed control. Adequate soil coverage is mandatory to achieve acceptable levels of weed control.

ZONE 4F herbicide mixing, solution stability and/or compatibility problems can occur when liquid fertilizers are used as a carrier. Compatibility tests must be conducted prior to mixing to insure tank mixture compatibility and stability. Compatibility agents may be beneficial to achieve and maintain a homogenous solution.

Liquid Fertilizer Mixing Directions

Fill the clean spray tank to one half of the total volume with the fertilizer solution. Start the spray tank agitation system. Pre-slurry ZONE 4F herbicide in a clean container with clean water using equal volumes of ZONE 4F herbicide and clean water. Slowly add the ZONE 4F herbicide/water slurry to the spray tank. Rinse the slurry container, adding the rinsate to the spray tank. Better mixing of the ZONE 4F herbicide/water slurry may be achieved if the slurry is added using induction systems on the sprayer fill plumbing system.

Fill the spray tank to the desired level using continuous agitation. Sufficient spray tank agitation is required at all times to maintain a homogenous spray solution. The spray system must be designed such that there is sufficient flow capacity to uniformly apply the spray mixture and maintain adequate tank agitation. Separate pumps may require to simultaneously supply the spray system and the spray tank agitation system. Insure the ZONE 4F herbicide slurry is thoroughly mixed before application.

Conduct a compatibility test for tank mixtures with other herbicide(s) to insure product compatibility before mixing. Read and follow all the directions, precautions and restrictions of the tank mixture products prior to mixing.

Apply the ZONE 4F herbicide spray mixture immediately after mixing. **DO NOT** store the sprayer overnight or for any extended period of time with the ZONE 4F herbicide spray mixture remaining in the tank. **DO NOT** premix ZONE 4F herbicide spray solutions in nurse tanks. Follow all ZONE 4F herbicide label directions regarding product use rates per acre, registered crops, application instructions, incorporation directions, special instructions and all precautions.

All individual state regulations including those relating to liquid fertilizer blending, storage, transportation, registration, labeling, and application are the responsibility of the individual and/or company preparing, selling or applying the ZONE 4F herbicide and fertilizer mixture.

MIXING AND LOADING INSTRUCTIONS

Mixing with Water

For best results, fill spray tank with one half of the volume of clean water needed for the area to be treated. Start the agitation system and add ZONE 4F herbicide to the tank. Make sure ZONE 4F herbicide is thoroughly mixed before application or before adding another product to the spray tank.

Use of Appropriate Surfactants

Temporary discoloration of some plants may result from use of surfactants or adjuvants with ZONE 4F herbicide. High temperatures and high relative humidity may increase the risk of temporary discoloration. Surfactants are recommended for some crops and not recommended for others. See surfactant recommendations in crop or site details below.

ZONE 4F herbicide may be applied alone, or in tank mixtures with other herbicides to increase the spectrum of weed control. Helm Agro has not tested all mixtures. ZONE 4F herbicide is believed to be compatible with most other crop protection products - fungicides, insecticides, growth regulators and spray adjuvants. Conduct appropriate compatibility tests and crop safety evaluations prior to tank mixing with other pesticides. Follow all precautions and restrictions on the tank mix partner label. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

When preparing a new tank mix conduct an appropriate compatibility test by mixing proportional amounts of all spray ingredients in a jar prior to tank mixing with other products. Shake the mixture vigorously and allow it to stand for five to ten minutes. Rapid precipitation of the ingredients and failure to re-suspend when shaken indicates that the mixture is incompatible and should not be applied. Provided the jar test indicates the mixture to be compatible, prepare the tank mixture using the mixing instructions below.

Before using ZONE 4F herbicide it is very important the spray equipment is clean and free of any previous pesticide deposits in the tank. Use the previous product's label that was used and follow Tank Cleanout procedures that are on the label. If no procedure is provided use the cleanout procedure on the ZONE 4F herbicide label marked SPRAYER CLEANOUT.

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Mixing Instructions

1. Fill the tank 1/2 full of water.
2. Start sprayer agitation system.
3. Pre-slurry ZONE 4F herbicide in a clean container using clean water.
4. Slowly add the ZONE 4F herbicide water slurry to the spray tank.
5. Rinse the slurry container, adding the rinsate to the spray tank.
6. Continue filling the spray tank to the desired level.
7. Maintain agitation at all times to maintain a uniform spray solution.
8. Before adding any other material ZONE 4F herbicide should be thoroughly mixed with water in the spray tank.
9. Mixing order should be as follows: Fill tank half-full and add ZONE 4F herbicide water slurry – while continue filling with water add other herbicide(s), recommended spray adjuvant and liquid nitrogen fertilizer if recommended.
10. Use the ZONE 4F herbicide spray mixture immediately after mixing.
11. **DO NOT** store the sprayer overnight or for any extended period of time with the ZONE 4F herbicide spray mixture remaining in the tank.
12. **DO NOT** premix ZONE 4F herbicide spray solutions in nurse tanks.
13. If ZONE 4F herbicide is tank mixed with other herbicides, all additional directions, restrictions and precautions for the tank mixture herbicides must be followed.

In addition, users must take appropriate steps to ensure proper equipment clean-out for any other products mixed with ZONE 4F herbicide as required on the other product labels. More complete cleaning can be achieved if the spray system is cleaned immediately following the application.

SPRAYER CLEANOUT

Residues left in mixing equipment, spray tanks, hoses, spray booms and nozzles can cause crop effects if they are not properly cleaned. Additionally, appropriate steps should be taken to ensure proper equipment clean-out for any other products mixed with ZONE 4F herbicide as required on the other product labels.

To avoid injury to desirable crops, thoroughly clean all mixing and spray equipment immediately following applications of ZONE 4F herbicide as follows:

1. Drain system completely including the tank, hoses, spray boom and spray nozzles/tips.
2. Thoroughly wash the interior surfaces of the tank with a high pressure washer.
3. Thoroughly flush tank, spray boom and hoses with clean water.
4. Remove the nozzles/tips and screens (tank, spray hose and spray tips) and clean separately in a bucket containing a 3% ammonia solution. Replace nozzles/tips and screens once cleaned.
5. Prepare a sprayer cleaning solution by adding three gallons of ammonia (containing at least 3% active) per 100 gallons of clean water. Prepare sufficient cleaning solution to allow the operation of the spray system for a minimum of 15 minutes to thoroughly flush hoses, spray boom and spray nozzles.
6. Cleaning of the sprayer will be more thorough if the ammonia solution or fresh water is left in the spray tank, hoses, spray booms and spray nozzles overnight or during storage.
7. Completely drain the sprayer system before using the sprayer.
8. Rinse the tank with clean water and flush through the hoses, spray boom, and spray nozzles with clean water.
9. After rinsing, once again remove and clean spray tips and all filters and screens (tank, spray hose and spray tip) separately in an ammonia solution.
10. Properly dispose of all cleaning solution and rinsate in accordance with Federal, State, and local regulations and guidelines.

DO NOT apply sprayer cleaning solutions or rinsate to sensitive crops. **DO NOT** drain or flush equipment on or near desirable trees or plants.

DO NOT store the sprayer overnight or for any extended period of time with ZONE 4F herbicide spray solution remaining in the tank, spray lines, spray boom plumbing, spray nozzles or strainers. If the sprayer has been stored or idle, purge the spray boom and nozzles with clean water before beginning any application.

DO NOT contaminate any body of water including irrigation water that may be used on other crops.

Should small quantities of ZONE 4F herbicide remain in inadequately cleaned mixing, loading, and/or spray equipment, they may be released during subsequent applications potentially causing effects to certain crops and other vegetation. Helm Agro accepts no liability for any effects due to inadequately cleaned equipment.

HANDLING INSTRUCTIONS AT MIXING SITE

ZONE 4F herbicide must not be mixed or loaded within 50 feet of wells - including abandoned wells and drainage wells, perennial or intermittent streams and rivers, natural or impounded lakes and reservoirs, and sinkholes. This setback does not apply to properly capped or plugged abandoned wells and does not apply to impervious pads or properly diked mixing/loading areas.

Operations that involve mixing, loading, rinsing, or washing of this product into or from pesticide handling or application equipment or containers 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. The impervious 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. The impervious pad must be self-contained and surface water must not be allowed to either flow over or from the pad. The pad shall be sloped to facilitate material removal. An unroofed pad shall be of sufficient capacity to contain at a minimum 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 exclude 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.

Product must be used in a manner that will prevent back siphoning in wells, spill or improper disposal of excess pesticide, spray mixtures or rinsates.

CROP ROTATIONAL RESTRICTIONS

The minimum interval in months from the time of the last ZONE 4F herbicide application until ZONE 4F herbicide treated soil can be replanted to various crops is listed in the following table. If ZONE 4F herbicide is tank mixed with another product, refer to the partner label for recropping instructions and follow the directions that are most restrictive.

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For all other crops not listed below, the rotational interval is a minimum of 12 months. Some crops have rotational intervals greater than 12 months after a ZONE 4F herbicide application due to potential crop injury. A representative bioassay of the field shall be completed with the rotational crop to accurately determine the planned crop's sensitivity to ZONE 4F herbicide.

Crop Rotational Restrictions Table

Crop	Interval in Months
Alfalfa	12
Asparagus	Anytime
Barley	4
Berries	Anytime
Brassica head and stem (Broccoli and Cabbage)	Anytime
Brassica leafy greens	Anytime
Cabbage	Anytime
Canola	24
Cereal Grains (Buckwheat, Oats, Pearl Millet, Proso Millet, Teosinte, Wild Rice)	12
Citrus	Anytime
Corn, Field	10
Corn, Pop	18
Corn, Sweet	18
Cotton	18
Cowpea succulent (TN only)	Anytime
Dry Shelled Beans and Peas	Anytime
Flax	Anytime
Fruiting Vegetables (except cucurbits)	Anytime
Grapes	Anytime
Horseradish	Anytime
Lima beans succulent (TN only)	Anytime
Melons	Anytime
Mint	Anytime
Peanuts	Anytime
Potatoes	Anytime
Rhubarb	Anytime
Rice	10
Rye	4
Sorghum	10* (18 - for rates above 8 oz./A)
Soybeans	Anytime
Strawberry	Anytime
Succulent peas	Anytime
Sugar Beets	36

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Crop Rotational Restrictions Table *(continued)*

Crop	Interval in Months
Sugarcane	Anytime
Sunflower subgroup 20B	Anytime
Sweet Potatoes	12
Tobacco	Anytime
Tomato (Transplanted Only)	Anytime
Tree Nuts	Anytime
Triticale	4
Turf	Anytime
Turnips	Anytime
Wheat	4
Wheat spring (Pacific Northwest states ID, OR WA only)	Anytime
All Other Crops	12

REPLANTING INSTRUCTIONS

If initial planting of labeled crops fails to produce a stand, only labeled crops for ZONE 4F herbicide or the tank mix partner, whichever is most restrictive, may be planted. **DO NOT** retreat field with ZONE 4F herbicide or other herbicide containing ZONE 4F herbicide. **DO NOT** plant treated fields with any crop at intervals that are inconsistent with the Rotational Crop Guidelines on this label. When replanting use minimum soil tillage to preserve the herbicide barrier and achieve maximum weed control.

WEEDS CONTROLLED

ZONE 4F herbicide applied alone or in recommended tank mixtures will provide control of the following weeds when applied in accordance with the Application information and the specific crop use directions. Refer to the specific crop section for more detail.

Common Name	Scientific Name
Amaranth, livid	*Amaranthus lividus*
Amaranth, Palmer	*Amaranthus palmeri*
Amaranth, Powell	*Amaranthus Powell II*
Amaranth, spiny	*Amaranthus spinosus*
Amaranth, spleen	*Amaranthus dubius*
Anoda, spurred	*Anoda cristata*
Bedstraw, catchweed	*Galium aparine*
Carpetweed	*Mollugo verticillata*
Chickweed, common	*Stellaria media*
Copperleaf, hophornbeam	*Acalypha ostryeafolia*
Copperleaf, Virginia	*Acalypha virginica*
Crabgrass, large	*Digitaria sanguinalis*
Crabgrass, smooth	*Digitaria ischaemum*
Crabgrass, Southern	*Digitaria ciliaris*
Croton, tropic	*Croton glandulosus*
Crownbeard, golden	*Verbesina encelioides*

(continued)

WEEDS CONTROLLED *(continued)*

Common Name	Scientific Name
Cupgrass, wooly	*Erichloa villosa*
Cyperus, hedgehog	*Cyperus compressus*
Daisy, American	*Eclipta alba*
Devilsclaw	*Proboscidea louisiana*
Dock, curly	*Rumex crispu*
Eclipta	*Eclipta prostrata*
Filaree, redstem	*Erodium cicutarium*
Flixweed	*Descurainia sophia*
Galinsoga, hairy	*Galinsoga ciliata*
Goosegrass	*Eleusine indica*
Groundcherry, clammy (seedling)	*Physalis heterophylla*
Groundcherry, cutleaf	*Physalis angulata*
Jimsonweed	*Datura stramonium*
Kochia (ALS and Triazine Resistant)	*Kochia scoparia*
Ladysthumb	*Polygonum persicaria*
Lambsquarters, common	*Chenopodium album*
Lettuce, miners	*Montia perfoliata*
Mallow, common	*Malva neglecta wall r.*
Mayweed, Chamomile	*Anthemis cotula l*
Milkweed, honeyvine	*Ampelamus albidus*
Morningglory, entireleaf	*Ipomoea hederacea integriuscula*
Morningglory, ivyleaf	*Ipomoea hederacea hederacea*
Morningglory, palmleaf	*Ipomoea wrightii*
Morningglory, purple	*Ipomoea turbinata*
Morningglory, red	*Ipomoea, coccinea L.*
Morningglory, scarlet	*Ipomoea coccinea*
Morningglory, smallflower	*Jacquemontia tamnifolia*
Morningglory, tall	*Ipomoea, purpurea*
Mustard, tumble	*Sisybrium altissimum*
Nightshade, black	*Solanum nigrum*
Nightshade, Eastern black	*Solanum ptycanthum*
Nutsedge, purple	*Cyperus rotundus*
Nutsedge, yellow	*Cyperus esculentus*
Orchardgrass	*Dactylis glomerata*
Panicum, fall	*Panicum dichotomiflorum*

(continued)

WEEDS CONTROLLED *(continued)*

Common Name	Scientific Name
Pigweed, redroot	*Amaranthus retroflexus*
Pigweed, smooth	*Amaranthus hybridus*
Plantain, blackseed	*Plantago rugelii decne*
Plantain, narrow-leaved	*Plantago lanceolata*
Poorjoe	*Diodia teres*
Porophyllum	*Porophyllum rederale*
Poinsettia, wild	*Euphorbia heterophylla*
Purslane, common	*Portulaca oleracea*
Redmaids	*Calandrinia ciliata*
Redweed	*Melochia corchorifolia*
Sedge, annual	*Carex spp.*
Senna, coffee	*Cassia occidentalis*
Sheperdspurse	*Capsella bursa-pastoris*
Sida, prickly	*Sida spinosa*
Sida, Southern	*Sida acuta*
Smartweed, PA (seedling)	*Polygonum pensylvanicum*
Smellmellon	*Cucumis melo*
Starbur, bristly	*Acanthospermum hispidum*
Stinkgrass	*Eragrostis cilianensis*
Toadflax, yellow	*Linaria vulgaris*
Tassleflower, red	*Emilio sonchifolia*
Thistle, Russian	*Salsola kali*
Waterhemp, common	*Amaranthus rudis*
Waterhemp, tall	*Amaranthus tuberculatos*
Waterprimrose, winged	*Ludwigia decurrens*
Witchgrass	*Panicum capillare*

MAXIMUM ALLOWABLE ZONE 4F herbicide- USE PER ACRE PER 12 MONTH PERIOD

The total allowed usage per twelve-month period includes all applications made to a field per twelve-month interval. This includes all treatments - fallow treatments, burndown treatments, planting time and all in-season treatments. The twelve-month period is considered to begin upon the initial ZONE 4F herbicide application. Refer to the crop section of this label for specific product use directions.

Crop	Ounces ZONE 4F herbicide Per Acre	Pound Active Sulfentrazone Per Acre
Oil Crops		
Flax	12.0	0.375
Mint	12.0	0.375
Permanent Crops		
Berries	12.0	0.375
Citrus	12.0	0.375
Grapes	12.0	0.375
Tree nuts	12.0	0.375
Row Crops		
Corn	8.0	0.25
Fallow	8.0	0.25
Peanuts	9.6	0.30
Potatoes	8.0	0.25
Soybean	12.0	0.375
Sugarcane	2.0	0.375
Sunflower subgroup 20B	8.0	0.25
Tobacco	12.0	0.375
Wheat, spring (Pacific Northwest states, ID, OR, WA only)	6.0	0.1875
Sod Production		
Turf	12.0	0.375
Vegetable Crops		
Asparagus	12.0	0.375
Brassica head and stem (Broccoli and Cabbage)	12.0	0.375
Brassica leafy greens	6.4	0.20
Cabbage	12.0	0.375
Cowpeas succulent (TN only)	6.0	0.1875
Dry Beans and Peas	8.0	0.25
Fruiting Vegetables and Okra (except cucurbits)	12.0	0.375
Horseradish	8.0	0.25
Lima Beans succulent (TN only)	6.0	0.1875
Melons	8.0	0.25

(continued)

MAXIMUM ALLOWABLE ZONE 4F herbicide- USE PER ACRE PER 12 MONTH PERIOD *(continued)*

Crop	Ounces ZONE 4F herbicide Per Acre	Pound Active Sulfentrazone Per Acre
Vegetable Crops		
Rhubarb	8.0	0.25
Strawberry	12.0	0.25
Succulent Peas	6.0	0.1875
Tomato (Transplant Only)	12.0	0.375
Turnips	8.0	0.25

IMPORTANCE OF SOIL PH

Always determine soil pH by laboratory analysis using a 1:1 ratio of soil to water suspension.

Variations of soil pH in the same field can vary as much as 2 pH units is not uncommon. Therefore, it is recommended that subsampling for pH values that may be higher than a field average. **DO NOT** depend on composite soil samples taken for analysis of soil fertility since they may not detect areas of high pH.

The following is a non-inclusive list of potential high pH areas where sub-sampling is recommended:

- Where different soil types are evident within a field, sample soil types separately.
- Where conditions vary within a field, sample areas separately, such as:

- areas bordered by limestone gravel roads,
- river bottoms subject to flooding,
- low areas in hardpan soils where evaporative ponds may occur,
- eroded hillsides,
- along drain tile lines, and
- areas where drainage ditch spoil has been spread.

- Where lime has not been deeply incorporated, soil may exhibit significantly higher pH values in the upper 3 inches of soil. Composite soil samples taken at a 6-8 inch depth may not reflect the elevated pH near the surface. In these cases shallow sampling, the upper 3 inches, is advised.

MANAGEMENT OF SPRAY DRIFT

AVOIDING SPRAY DRIFT IS THE RESPONSIBILITY OF THE APPLICATOR. Factors relating to the potential for spray drift are many. The most common is the interaction of many equipment and weather-related factors that can determine potential spray drift. The applicator and the grower are responsible for considering all these factors when making decisions. Ultimately it is the applicator that is responsible for taking all these factors into consideration when making decisions on applications. To avoid drift, **DO NOT** apply when wind speeds exceed 10 mph. **DO NOT** exceed spray pressures of 40 psi unless specified by the manufacturer of drift reducing spray tips and nozzles.

The following drift management requirements must be followed to avoid off-target movement from aerial applications. These requirements **DO NOT** apply to forestry applications, public health uses or to applications of dry materials.

1. The distance of the outermost nozzles on the boom must not exceed ¾ 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.
3. Observe the regulations of the State where applications are made.
4. Applicators must observe and abide by the requirements of the Aerial Drift Reduction Advisory.

IMPORTANCE OF DROPLET SIZE

APPLYING LARGER DROPLETS REDUCES SPRAY DRIFT POTENTIAL, BUT IT WILL NOT PREVENT DRIFT IF APPLICATIONS ARE MADE IMPROPERLY OR MADE UNDER UNFAVORABLE ENVIRONMENTAL CONDITIONS. This is the best strategy to manage the potential for spray drift and is based upon larger droplets to provide better coverage and control. Factors that also can affect an applicator's decision on balancing drift control and coverage are: the presence of non-targeted crops nearby – environmental conditions – and pest pressures.

Controlling Droplet Size- General Techniques

- Select nozzles and application pressure that deliver medium to coarse or larger spray droplets as indicated in the nozzle manufacturer's recommendations and in accordance with ASABE* Standard S-572.
- Select coarse to very coarse droplet size when sulfentrazone is used as a preemergent/preplant application.
- Select medium to very coarse droplet size when sulfentrazone is used postemergence with a contact burndown herbicide.
- Applicators may spray only when wind speed is between 3 and 10 mph.
- Do not apply as spray droplets smaller than medium to coarse (defined by the ASABE* standard).

Volume - Nozzles with higher rated flows produce larger droplets. Use high flow rate nozzles to apply the greatest practical spray volume.

Pressure - WHEN HIGHER FLOW RATES ARE NEEDED, USE A HIGHER-CAPACITY NOZZLE INSTEAD OF INCREASING PRESSURE. Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration and deposition.

Number of Nozzles – Use the minimum number of nozzles that provide uniform coverage.

Nozzle Orientation – For aerial application, the recommended practice is to orient nozzles so that the spray is released parallel to the airstream. This orientation usually produces larger droplets as compared to other nozzle orientations. Significant nozzle deflection from horizontal will reduce droplet size and increase drift potential.

Nozzle Type - With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Use a nozzle type that is designed for the intended application. Solid stream nozzles oriented straight back usually produce the largest droplets and the lowest drift potential in aerial applications.

Boom Length – For some aerial use patterns, reducing the effective boom length to less than ¾ of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height - Set the boom at the lowest labeled height (if specified) which provides uniform coverage reduces the exposure of droplets to evaporation and wind.

Aerial: Applications should not be made at a height greater than 10 feet above the top of the Target plant canopy 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.

Ground: For ground equipment, the boom should be set at a height that provides uniform coverage. The boom should remain level with the crop and have minimal bounce.

Swath Adjustment – When aerial applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the upwind and downwind edges of the field, the applicator must compensate for this displacement by the path of the aircraft upwind. Swath adjustment or offset distance should increase when conditions favor increased drift potential (higher winds, smaller droplets, etc.).

EFFECTS ON DRIFT POTENTIAL BY – WIND – TEMPERATURE AND HUMIDITY TEMPERATURE INVERSIONS

Wind

Drift potential increases at wind speeds of more than 10 mph or less than 3 mph (due to inversion potential). However, many factors, including droplet size and equipment type determine drift potential at any given wind speed. AVOID GUSTY OR WINDLESS CONDITIONS. Application should be avoided below 3 mph due to variable wind direction and high inversion potential. Every applicator should be familiar with local wind patterns and how they may potentially affect spray drift.

TEMPERATURE INVERSIONS

Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain close to the ground and move laterally in a concentrated cloud. Drift potential is high during a temperature inversion. Temperature inversions are common on nights with limited cloud cover and light to no wind and are characterized by increasing temperature with altitude. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

TEMPERATURE AND HUMIDITY

When making applications in hot and dry conditions, set up equipment to produce larger droplets to reduce effects of evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

SENSITIVE AREAS

The pesticide should only be applied when the wind is blowing away from sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops).

OFF-TARGET MOVEMENT OF ZONE 4F herbicide

Drift of dilute spray mixtures containing ZONE 4F herbicide must be prevented. Observation of the preceding environmental conditions, correct application equipment design, calibration and application practices detailed in this label will significantly diminish the risk of off-target spray drift. ZONE 4F herbicide can cause significant symptomology by drift on to sensitive crops and other plants. This symptomology may manifest initially as discreet, localized spots where contacted by ZONE 4F herbicide drift mixtures. Depending on concentration of the spray solution and droplets size and also depending on the inherent sensitivity of the plants involved, these spots or lesions may or may not coalesce. These effects will usually not have lasting effects on plant growth, but will likely reduce the value of affected fruit or foliage where grade or quality is associated with appearance. In severe drift instances with particularly sensitive crops, defoliation of affected foliage could result. Failure to follow these guidelines and environmental prohibitions that then result in off-target movement or drift of ZONE 4F herbicide on to unintended crops or plants, irrespective of severity, constitutes misapplication of this product. HELM AGRO accepts no responsibility or liability for potential crop effects that may result from such misapplication of ZONE 4F herbicide.

APPLICATION INSTRUCTIONS

ZONE 4F herbicide may be applied to soil in the following use patterns:

- Preplant incorporated treatment
- Surface applied preemergence (prior to weed and/or crop emergence)
- Post-plnt treatments - over-the-top and layby - in various crops.

Application methods are defined in the Crop Use Directions sections.

Pre-plant incorporated treatments require a uniform surface application followed by incorporation. Avoid incorporating to a depth greater than 2 inches or poor weed control may result. Application overlaps should be avoided or an excessive ZONE 4F herbicide rate will result that may cause adverse crop response.

Adequate moisture is required for herbicidal activation for all soil applications and for residual activity of post-plant applications of ZONE 4F herbicide. The optimum amount of moisture, whether supplied by rainfall or irrigation, is dependent on several factors. These factors include but are not limited to:

- existing soil moisture at application
- soil type
- organic matter
- and soil tilth

In crop situations dependent on rainfall, ZONE 4F herbicide can await activating moisture for 10 to 14 days depending on the soil parameters described above. Once activated, ZONE 4F herbicide will provide activity on existing weeds with the level of activity being dependent on the weed species and their size at time of activation. A shallow incorporation is recommended for destruction of any germinating weeds and to incorporate ZONE 4F herbicide where irrigation is not available and rainfall has not provided activation, particularly for surface applications of ZONE 4F herbicide. Herbicide incorporation will initiate the process of activation with existing soil moisture. In circumstances where prolonged periods without rainfall and/or irrigation is not possible, alternative or additional weed management practices (cultivation or post-applied herbicides) may be required.

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In order to avoid adverse crop response, extreme care must be exercised and the Crop Specific Use Directions followed exactly in crops allowing post plant applications of ZONE 4F herbicide. Over-the-top and lay-by applications will provide contact and residual weed control, depending on species. The addition of surfactants may increase contact weed control performance but may also increase the risk of adverse crop response.

BAND TREATMENT APPLICATIONS

For band treatments, apply the broadcast equivalent rate and volume per acre. To determine these:

$$\frac{\text{Band Width in Inches}}{\text{Broadcast Band Volume}} \times \text{Broadcast Rate Per Acre} = \text{Band Rate}$$

$$\frac{\text{Band Width in Inches}}{\text{Row Width in Inches}} \times \text{Broadcast Volume Per Acre} = \text{Band Volume}$$

ZONE 4F herbicide Product Use Rates

The following directions for the selection of ZONE 4F herbicide application rates are critical to achieve maximum weed control and maximum crop safety. The user must read and follow the specific ZONE 4F herbicide use directions and restrictions for each crop as defined in subsequent sections of this label. The user is cautioned that some crops respond differently to ZONE 4F herbicide. This response is tied to the ZONE 4F herbicide application rate, various soil factors and inherent crop sensitivity. The Crop Specific Use Directions have been designed to minimize the risk of adverse crop response while maintaining optimum weed control.

Germinating seeds and seedlings pick up ZONE 4F herbicide from the soil solution following the application of ZONE 4F herbicide to soil. The amount of available ZONE 4F herbicide in soil solution for weed uptake is determined primarily by soil type, organic matter and soil pH. Sulfentrazone adsorbs to clay and organic matter (OM) fractions of soils; effectively limiting the amount of active ingredient immediately available to control weeds. Soils typically increase in clay content through the series from coarse to fine as noted in the following Soil Classification Chart:

Soil Classification Chart

COARSE	MEDIUM	FINE
Sand	Sandy clay loam	Silty clay loam
Loamy sand	Sandy clay	Silty clay
Sandy loam	Loam	Clay loam
	Silt Loam	Clay
	Silt	

Influence of Soil type, organic matter and pH on ZONE 4F herbicide Use Rates and Crop Response.

Soil organic matter content varies widely and independently of soil type and requires an accurate analysis of representative soil samples to determine its content. Soil pH also exerts a dramatic effect on ZONE 4F herbicide availability in the soil solution - as soil pH increases, ZONE 4F herbicide availability increases.

Accurate soil pH information will require an accurate analysis of representative soil samples. The total amount of ZONE 4F herbicide available in solution, in any given soil, is determined by the complex interaction of soil type (clay content), % organic matter and pH. The application timing (relative to the emergence of the crop and weeds) and amount of rainfall and/or irrigation received will ultimately determine, in conjunction with the soil parameters and pH, the amount of ZONE 4F herbicide in soil solution. It is important to note that ZONE 4F herbicide can await activating moisture for 10 to 14 days. However, diminished weed control may result due to the successive increase in weed growth versus timing of activation.

Irrigation with highly alkaline water (high pH) following a ZONE 4F herbicide soil application can significantly increase the amount of ZONE 4F herbicide available in the soil solution. Irrigation with water having a pH greater than 7.5 may result in adverse crop response. This response will ultimately depend on numerous factors including initial ZONE 4F herbicide application rate, timing, amount and pH of irrigation water and sensitivity of the crop and its growth stage when irrigated. The risk of adverse crop response will lessen with the advance in growth stage among most crops. The following Crop Specific Use Directions have been designed with specific ZONE 4F herbicide recommendations for each crop based on the soil type, soil organic matter, and soil pH interactions described above. The user is cautioned that crop tolerance and weed control performance are based on strict adherence to these recommendations.

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CROP SPECIFIC USE DIRECTIONS ROW CROPS
FALLOW OR POST HARVEST BURNDOWN

Application

Apply ZONE 4F herbicide in the fall following crop harvest or in existing fallow fields of asparagus, cabbage, corn, dry shelled beans and peas, horseradish, lima beans, mint, peanuts, potatoes, soybeans, sugarcane, sunflowers and tobacco.

ZONE 4F herbicide Use Rates for Fall (only in the States of CO, ID, MI, MN, MT, NE, OR, ND, SD, WA, WI, and WY) and Spring Fallow, or Postharvest Burndown Applications

Broadcast rate	Fluid Ounces of ZONE 4F herbicide per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	3.0 – 3.75	3.0 – 4.5	3.75 – 5.25
1.5 – 3.0 %	3.0 – 5.25	3.75 – 6.0	4.5 – 6.75
>3%	4.5 – 6.0	4.5 – 8.0	5.25 – 8.0

Coarse = Sand, Loamy Sand, Sandy Loam
Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt
Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay

Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.

ZONE 4F herbicide may be tank mixed with other herbicides registered for use in fallow fields or postharvest Burndown applications. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

Fall Application (only in the States of CO, ID, MI, MN, MT, NE, OR, ND, SD, WA, WI, and WY)

Apply ZONE 4F herbicide in the fall following crop harvest or in the fall following crop harvest or in existing fallow fields to control or suppress weeds the following season. Follow Crop Rotational Guidelines if crops are planted the next season. Apply to the stubble/soil surface and allow moisture from rainfall or snow to move the product into the soil. The active ingredient – sulfentrazone will be moved and activated by moisture in the form of rain or snow. **DO NOT** mechanically incorporate in the fall or spring as this will destroy the herbicide barrier and allow weed escapes to occur. **DO NOT** apply to frozen soils or to existing snow cover to prevent ZONE 4F herbicide runoff from rain or snow melt that may occur following application.

ZONE 4F herbicide may be tank mixed with other herbicides registered for use in fallow fields or postharvest Burndown applications. Sequential applications may be required depending on weed size. If weeds are large enough to prevent the herbicide application from reaching the soil surface, a separate burndown application prior to the application of ZONE 4F herbicide, or sequential applications as needed. Use full, recommended rates of burndown herbicides in combination with ZONE 4F herbicide, or sequential applications as needed. Higher aerial spray volumes are required when there is a dense weed population or canopy.

Spring Application

Apply ZONE 4F herbicide in the early spring provided the application is made prior to weed emergence and adequate moisture is available to activate the herbicide. Follow the same use recommendations and application guidelines listed in the fall application in the above section.

Fallow and Post-Harvest Weeds Controlled

When Applied according to directions, ZONE 4F herbicide will provide control of:

- Common lambsquarters
- Common waterhemp
- Eastern black nightshade
- Ivyleaf morningglory
- Kochia (ALS and Triazine Resistant)
- Redroot pigweed
- Redstem Filaree
- Russian thistle
- Smooth pigweed
- Tall morningglory
- Tall waterhemp

These Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all crop varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 8.0 fluid ounces (0.25 lbs active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 8.0 fluid ounces (0.25 lbs active) per acre of ZONE 4F herbicide per twelve-month period. The twelve-month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** apply to frozen soils or existing snow cover to prevent ZONE 4F herbicide runoff from rain or snowmelt that may occur following application.

SOYBEANS

Application

ZONE 4F herbicide may be used in conventional tillage, conservation tillage, reduced tillage or no-tillage cropping systems using rates recommended in the Use Rate Table below. May be applied as a fall preplant (fall PP), spring preplant (spring PP), early preplant (early PRE), preemergence (PRE) or preplant incorporated (PPI) soil applied treatment for the control of broadleaf weeds, grasses and sedges. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Apply ZONE 4F herbicide in soybeans with aerial or ground equipment calibrated to deliver a minimum of 5 gallons of finished spray by air and a minimum of 10 gallons of finished spray by ground. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Soybeans Fall and Spring Preplant, Early Preplant, Preemergence, and Preplant Incorporation Applications			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	4.5 – 6.0	6.0 – 8.0	8.0
1.5 – 3.0 %	6.0 – 8.0	8.0 – 10.1	10.1
>3%	8.0 – 10.1	10.1 – 12.0	12.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in soybeans. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture			

Preplant Incorporated (PPI) and Preemergence (PRE) Applications

ZONE 4F herbicide can be applied prior to planting to 3 days after planting. If applications after planting are delayed greater than 3 days after planting, injury may occur if seeds are germinating. ZONE 4F herbicide may be applied PRE or PPI. For PPI applications, incorporation must be uniform and no deeper than 2 inches. Improper soil incorporation may result in crop injury and/or erratic weed control. ZONE 4F herbicide applied near (later that 3 days after planting) or after crop emergence may cause severe injury to the crop. ZONE 4F herbicide can be applied alone or in tank mixes with other labeled soybean herbicides. ZONE 4F herbicide may be followed by labeled postemergence soybean herbicides for increased control of grass and broadleaf weeds. Always follow the most restrictive label when tank mixing. When using ZONE 4F herbicide in no-till or minimum till cropping systems for improved control of existing weeds, tank mix with an appropriate burndown herbicide – such as glyphosate or paraquat products.

Fall Applications

Apply ZONE 4F herbicide as a fall treatment to harvested crop stubble after crops are harvested for burndown of existing vegetation and PRE control of labeled weeds the following spring in no-till and conservation tillage production systems. Fall applications of ZONE 4F herbicide must be made in weed control programs that include, as needed, spring applications of EPP, PRE or POST (postemergence to the targeted weeds) herbicides for the following crop season. Apply ZONE 4F herbicide to harvested crop stubble in no-till or to the soil surface of conservation tillage fields after harvest when the sustained soil temperature is 55 degrees F and falling at a soil depth of 4 inches. Apply at the following times:

After September 30th - North of I-90

After October 15th - North of I-70

DO NOT apply as a fall treatment - South of I-70.

Applications to ridge till production systems must be made after bedding or ridge formation.

If weeds have emerged at the time of application, utilize a tank mixture with a suitable burndown herbicide – such as glyphosate or paraquat - at labeled rates. Apply fall burndown applications with a minimum of 20 gallons per acre to achieve adequate coverage of the weeds being treated. Add COC or MSO adjuvants to the spray mixture when making burndown applications to emerged weeds to enhance the burndown activity of the application.

Soybean Weeds Controlled

When Applied according to directions, ZONE 4F herbicide will provide control of:

Common lambsquarters
Hophornbeam copperleaf
Kochia (ALS and Triazine Resistant)
Morningglory, spp.
Nightshade
Palmer amaranth
Pigweed, spp.
Prickly sida
Russian thistle
Waterhemp, spp.

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

When tank mixing ZONE 4F herbicide with other registered herbicides, refer to specific label information on precautions, instructions, limitations, application methods and timings, and weeds controlled. ZONE 4F herbicide is effective against a wide range of economic broadleaf and grass weeds. The same processes that ZONE 4F herbicide affects in these weeds can, under certain conditions, be affected in soybeans. Conditions where soybeans can be effected include high pH (7.5 and above), cool weather, prolonged and excessive moisture, seedling diseases, and other conditions, including poor agronomic practices, that are unfavorable to vigorous crop growth. These effects in soybeans are often expressed as stunting and discoloration. The duration of these effects are somewhat dependent on the duration of the adverse growing conditions. These effects lessen and generally diminish with the return to normal growing conditions.

These Soybean Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all soybean varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per twelve-month period. The twelve-month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** apply to frozen soils or existing snow cover to prevent ZONE 4F herbicide runoff from rain or snowmelt that may occur following application.
- **DO NOT** apply after crop seed germination.

SUGARCANE

Application

Apply ZONE 4F herbicide as a broadcast or banded preemerge (PRE) soil applied treatment for the control of broadleaf weeds, grasses and sedges in sugarcane. Additionally may be used as a directed lay-by (LB) at the lay-by timing. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. For at planting applications apply ZONE 4F herbicide in sugarcane with aerial or ground equipment calibrated to deliver a minimum of 5 gallons of finished spray by air and a minimum of 15 gallons of finished spray by ground. In layby applications apply ZONE 4F herbicide in sugarcane with ground equipment calibrated to deliver a minimum 15 gallons of finished spray by ground application. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Sugarcane Planting Time and Lay-by Applications			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	4.5 – 6.0	6.0 – 8.0	8.0
1.5 – 3.0 %	6.0 – 8.3	8.0 – 10.1	10.1
>3%	8.0 – 10.1	10.1 – 12.0	12.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in sugarcane. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

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Planting Time Applications

Apply ZONE 4F herbicide preemerge to newly planted or rattoon sugarcane. The higher rate should be used on clay soils and/or soils with organic matter content higher than 2 percent. Application may be made by air or ground. For aerial application, apply in a minimum of 5 gallons of spray per acre or by ground equipment in a minimum of 15 gallons of spray per acre.

Lay-by Applications

ZONE 4F herbicide may be applied as a directed spray to sugarcane at lay-by timing. The higher rate should be used on clay soils and/or soils with organic matter content higher than 2 percent. Apply as a directed spray with ground equipment in a minimum of 15 gallons of spray per acre.

Sugarcane Weeds Controlled

When Applied according to directions, ZONE 4F herbicide will provide control of:

Entireleaf morningglory
Ivyleaf morningglory
Red morningglory
Redroot pigweed
Tall morningglory
Yellow nutsedge

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

These Sugarcane Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all sugarcane varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply within 120 days of harvest.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** allow spray to contact crop leaves.
- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per acre per twelve-month period. The twelve-month period is considered to begin upon the initial ZONE 4F herbicide application.

SUNFLOWERS

Application

Apply ZONE 4F herbicide as fall preplant (fall PP) or spring preplant (spring PP) and preemerge (PRE) soil applied treatment for the control of broadleaf weeds, grasses and sedges in sunflower. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in a minimum of 10 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Sunflowers Fall Preplant, Early Spring Preplant, Preplant, Preemergence and Preplant Incorporated Applications			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	3.0 – 3.75	3.0 – 4.5	3.75 – 5.25
1.5 – 3.0 %	3.0 – 4.5	3.75 – 6.0	4.5 – 6.75
>3%	3.75 – 6.0	4.5 – 6.75	6.0 – 8.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in sunflower subgroup 20B. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

Fall Applications - For use only in ND, SD, MT, MN, WY, CO, NE, and KS

Apply ZONE 4F herbicide as a pre-plant treatment in the fall to control or suppress weeds prior to planting sunflowers the following spring. Apply to the stubble/soil surface and allow moisture from rainfall or snow to move the product into the soil. **DO NOT** mechanically incorporate in the fall or spring as this will destroy the herbicide barrier and allow weed escapes to occur. **DO NOT** apply to frozen soils or to existing snow cover to prevent ZONE 4F herbicide runoff from rain or snow melt that may occur following application. If weeds are emerged at the time of ZONE 4F herbicide application, tank mix with a burndown herbicide such as glyphosate or paraquat at the full-labeled rate in combination with ZONE 4F herbicide or apply as a split application as needed. Select the appropriate rate from the table above within the correct soil type and organic matter range. When using ZONE 4F herbicide in the fall, use a mid to high rate within the rate range for the appropriate soil type and organic matter.

Early Preplant (EPP) and Preemergence (PRE) - Spring Applications

Apply ZONE 4F herbicide as a pre-plant application to the soil surface in the spring to control weeds in sunflowers. Apply ZONE 4F herbicide as an EPP application prior to planting up to 3 days after planting as a PRE soil application if seedlings have not broken the soil surface as long as the seed furrow is completely closed. For PRE applications greater than 3 weeks prior to planting, use the high rate within the appropriate rate range for the soil and organic matter type listed in the use rate table above. If dry conditions persist following PRE application of ZONE 4F herbicide, a shallow incorporation may be needed to incorporate and activate the herbicide. If weeds are emerged at the time of ZONE 4F herbicide application, use a burndown herbicide – such as glyphosate or paraquat - at the full-labeled rate in combination with ZONE 4F herbicide or split application as needed.

Preplant Incorporated (PPI)

ZONE 4F herbicide may be applied as a PPI treatment in the spring prior to planting in reduced and conventional tillage sunflowers. ZONE 4F herbicide should be incorporated in the soil no deeper than 2 inches. Incorporating ZONE 4F herbicide deeper than 2 inches can result in inconsistent weed control. Use the appropriate rate from table above for the soil texture, organic matter, and pH level. ZONE 4F herbicide can be tank mixed with other soil-applied herbicides labeled for pre-plant incorporation in sunflowers.

Sunflower Weeds Controlled

When Applied according to directions, ZONE 4F herbicide will provide control of:

Common lambsquarters
Common waterhemp
Eastern black nightshade
Ivyleaf morningglory
Kochia (ALS and Triazine resistant)
Palmer amaranth
Prickly sida
Redstem filaree
Redroot pigweed
Russian thistle
Smooth pigweed
Tall morningglory
Tall waterhemp

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

When applying ZONE 4F herbicide to coarse textured soils, allow a minimum of 7-14 days from application to planting. Best results are achieved with ZONE 4F herbicide when applications are made EPP and greater than 14 days before planting.

Adverse crop response may occur in the following conditions:

- on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.8 or higher
- on highly eroded soils
- in areas of calcareous outcroppings.

ZONE 4F herbicide use rates should be reduced in those areas.

- Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response.
- Poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases

These Sunflower Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all sunflower varieties or cultivars been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 8.0 fluid ounces (0.25 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 8.0 fluid ounces (0.25 lb active) of ZONE 4F herbicide per twelve-month period to sunflowers. The twelve-month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT** apply to frozen soils or existing snow cover to prevent ZONE 4F herbicide runoff from rain or snowmelt that may occur following application
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** incorporate greater than 2 inches deep.
- **DO NOT** apply using a mechanically pressurized handgun.

TOBACCO – Burley, Flue-Cured and Dark

Application

Apply ZONE 4F herbicide as a surface applied preemergence (PRE) or preplant incorporated (PPI) application - to a depth no greater than 2 inches from 14 days to 12 hours days prior to transplanting tobacco. Incorporating ZONE 4F herbicide deeper than 2 inches can result in inconsistent weed control. Refer to the ZONE 4F herbicide Product Use Rate Table below and broadcast apply the appropriate rate, in a minimum of 10 gallons of finished spray per acre to the soil prior to transplanting. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Tobacco Preemergence and Preplant Incorporated Applications			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	4.5 – 6.0	6.0 - 8.0	8.0
1.5 – 3.0 %	6.0 – 8.0	8.0 – 10.1	10.1
>3%	8.0 – 10.1	10.1 – 12.0	12.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

Bedded - Where raised beds ARE formed PRIOR to transplanting

Apply ZONE 4F herbicide as a surface application to formed beds from 14 days to 12 hours prior to transplanting. Drag or knock down beds if needed prior to transplanting. This procedure must be performed prior to the ZONE 4F herbicide application or decrease weed control will occur. If ZONE 4F herbicide must be incorporated prior to bedding it must be thoroughly and uniformly incorporated to a depth no greater than 2 inches so the product is not concentrated in the bed. If initial transplanting fails to produce a uniform stand, tobacco may be replanted. **DO NOT** re-treat field with a second application with any other herbicide containing ZONE 4F herbicide. **DO NOT** re-bed. Re-transplant into previously formed, treated beds. For broad spectrum and optimum grass weed control a grass herbicide application will be required.

Non-Bedded - Where raised beds are NOT formed prior to transplanting

Complete all cultural practices for land preparation, fertilizer/fungicide incorporation, etc. then apply ZONE 4F herbicide as a surface application or as a lightly pre-plant incorporated application from 14 days to 12 hours prior to transplanting. If ZONE 4F herbicide is surface applied and it is necessary to remove equipment tracks from the field after application but prior to transplanting, light finishing equipment may be used providing the soil is not disturbed to a depth greater than 2 inches. If timely cultivations are not performed following a pre-transplant surface application, reduced/unacceptable weed control may occur in the drill.

Tobacco Weeds Controlled

When Applied according to directions, ZONE 4F herbicide will provide control of:

- Broadleaf signalgrass
- Common lambsquarters
- Hairy galinsoga
- Ivyleaf morningglory
- Livid amaranthus
- Pennsylvania smartweed
- Prickly sida
- Redstem filaree
- Redroot pigweed
- Smooth pigweed
- Tall morningglory

For information on other weeds not listed above, refer to Weed Controlled section in this label.

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Precautions

Tobacco transplant growth may be adversely effected under the following conditions:

- Poor agronomic practices
- Unfavorable pH soils
- Diseases
- Cold weather
- Excessive moisture
- Drought
- Other conditions unfavorable to normal plant growth.
- Weakened transplants may be more susceptible to herbicide response and diseases, particularly under poor drainage or compacted soil conditions or when the soil has been saturated for long periods of time.

These Tobacco Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all tobacco varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Contact your State Agricultural Extension Service Specialist for consultation as to the agronomic recommendations suited for your tobacco varieties and local conditions. If transplants are set too shallow, or if heavy rainfall occurs immediately following transplanting, temporary stunting of tobacco may occur. Splashing of treated soil onto tobacco leaves may cause some localized and inconsequential necrosis. Use sound transplanting practices that insure treated soil will not wash or crust over tobacco plants. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** incorporate to depths greater than 2 inches.
- **DO NOT** use on Shade Grown Tobacco.
- **DO NOT** use ZONE 4F herbicide in tobacco seeding beds or greenhouses.
- **DO NOT** apply ZONE 4F herbicide post-transplant as unacceptable injury may occur.
- **DO NOT** perform tillage practices that concentrate ZONE 4F herbicide into the bed or crop injury may occur.
- **DO NOT** apply within 14 days prior to harvest.

CROP SPECIFIC USE DIRECTIONS

VEGETABLE CROPS

Before applying ZONE 4F herbicide to vegetable crops, users, producers, and/or applicators must read and follow the information presented in the Conditions of Sale and Limitation of Warranty and Liability section at the end of this label. In some cases additional requirements may apply. If so the requirements will be noted immediately following the crop heading.)

ASPARAGUS - For Use in California and Michigan Only

(Before applying ZONE 4F herbicide to asparagus, users, producers, and/or applicators must read and follow the information presented in the Vegetable Disclaimer found under the TERMS OF SALE OR USE section at the end of this label. In some cases additional requirements may be required.)

Application

Apply ZONE 4F herbicide as a preemergence (PRE) broadcast application to asparagus crowns established for at least one year. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in 10 to 40 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

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ZONE 4F herbicide Use Rates for Asparagus (For Use in California and Michigan Only) Spring Preemergence Applications			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	4.5 – 6.0	6.0 – 8.0	8.0
1.5 – 3.0 %	6.0 – 8.0	8.0 – 10.1	10.1
>3%	8.0 – 10.1	10.1 – 12.0	12.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in asparagus. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture			

PREEMERGENCE (PRE)

Apply in the spring before crop or weed emerge. ZONE 4F herbicide should be applied at 4.5 to 12 ounces (0.141 to 0.375 lb active) per acre in 10 to 40 gallons of finished spray per acre. ZONE 4F herbicide may be applied with other pesticides registered for use with asparagus.

Asparagus Weeds Controlled

When applied according to directions, ZONE 4F herbicide will provide control of:

- Common lambsquarters
- Eastern black nightshade
- Hairy galinsoga
- Ivyleaf morningglory
- Palmer amaranth
- Redroot pigweed
- Smooth pigweed
- Yellow nutsedge

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

These Asparagus Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all asparagus varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre per 12-month period.
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT apply to soils classified as sand containing less than 1% organic matter.**
- **DO NOT** apply within 14 days prior to harvest.

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CABBAGE – Transplanted only

Application

Apply ZONE 4F herbicide as a broadcast soil application at the following timings: fall preplant, (fall PP), spring preplant (spring PP), preemergence (PRE) or preplant incorporated (PPI) for the control of broadleaf weeds and grasses in transplanted cabbage prior to transplanting. ZONE 4F herbicide may be applied as a banded treatment into the row middles within 72 hours after transplanting. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in a minimum of 10 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Cabbage (Transplanted only) Fall Preplant, Spring Preplant, Preemergence and Preplant Incorporated Applications

Broadcast rate	Fluid Ounces of ZONE 4F herbicide per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	2.25 – 3.0	3.0 – 4.5	3.0 – 6.0
1.5 – 3.0 %	3.0 – 6.0	6.0 – 9.0	6.0 – 9.0
>3%	6.0 – 9.0	6.0 – 12.0	6.0 – 12.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in cabbage. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

Early Preplant - Spring Application

When applying early preplant to cabbage, the product may be applied only in CO, ID, MI, MN, MT, ND, NE, OR, SD, WA, WI, and WY. Apply ZONE 4F herbicide from 60 days prior to planting up to planting time in the spring for the control of weeds in cabbage. Apply as a broadcast application to harvested crop stubble or soil surface without incorporation. Moisture in the form of rain or snow is required to move and activate the product in the soil. **DO NOT** mechanically incorporate as this will destroy the herbicide barrier and allow weed escapes to occur. **DO NOT** apply to frozen soils to prevent ZONE 4F herbicide runoff from rain or snow that may occur following application. ZONE 4F herbicide may be tank mixed with other burndown herbicides such as glyphosate or paraquat to control emerged weeds in the fall or spring or with residual soil herbicides that are labeled for fall use on cabbage. Use the full, recommended rates of burndown herbicides in combination with ZONE 4F herbicide, or split applications as needed. Observe all precautions, instructions, and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.

Preplant Incorporated (PPI)

Apply ZONE 4F herbicide as a PPI treatment in the spring prior to transplanting cabbage. **DO NOT** incorporate to depths greater than 2 inches. ZONE 4F herbicide can be tank mixed with other burndown or soil-applied herbicides labeled for use in cabbage. Use the full, recommended rates of burndown herbicides or split applications as needed. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing including all references to potential carryover and crop injury warnings or restrictions.

Transplant Cabbage

Apply ZONE 4F herbicide as a broadcast or banded treatment PRE application to transplanted cabbage only. Applications should be made broadcast or banded treatment prior to transplanting. ZONE 4F herbicide may be applied as a banded treatment into the row middles within 72 hours after transplanting.

Cabbage Weeds Controlled

When applied according to directions, ZONE 4F herbicide will provide control of:

- Common lambsquarters
- Common waterhemp
- Hairy galinsoga
- Redroot pigweed
- Smooth pigweed
- Tall waterhemp

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

These Cabbage Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all cabbage varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

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Restrictions

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** incorporate to depths greater than 2 inches.

COWPEAS (SUCCULENT) – For Use in Tennessee Only

Application

Apply ZONE 4F herbicide as a Preemergence (PRE) application by ground in succulent cowpeas. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in a minimum of 10 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Cowpeas (Succulent) Preemergence Application (Tennessee only)			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	2.25 – 3.75	3.0 – 6.0	3.75 – 6.0
1.5 – 3.0 %	3.0 – 4.5	3.75 – 6.0	4.5 – 6.0
>3%	3.75 – 6.0	4.5 – 6.0	5.25 - 6.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			

Apply ZONE 4F herbicide to cowpeas as a PRE treatment at 6.0 fluid ounces (0.1875 pounds active) per acre. Applications should be made with ground equipment in a minimum of 10 gallons of finished spray per acre.

Cowpeas (Succulent) Weeds Controlled

When applied according to directions, ZONE 4F herbicide will provide control of:

Entireleaf morningglory
Hophornbeam copperleaf
Ivyleaf morningglory
Redroot pigweed
Smooth pigweed

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

When applying ZONE 4F herbicide to coarse textured soils, allow a minimum of 7-14 days from application to planting. Best results are achieved with ZONE 4F herbicide when applications are made EPP and greater than 14 days before planting.

Under extended periods of dry weather, adequate weed control may not be achieved.

Adverse crop response may occur in the following conditions:

- on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.8 or higher
- on highly eroded soils
- in areas of calcareous outcroppings.

ZONE 4F herbicide use rates should be reduced in these areas.

Additionally adverse crop response may occur if:

- Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response.
- Poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases.

Precautions

These Cowpea Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all cowpea varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 6.0 fluid ounces (0.1875 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 6 fluid ounces (0.1875 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** incorporate.
- **DO NOT** allow livestock to graze on treated plants or feed treated plants or plant trash to livestock.
- **DO NOT** apply using a mechanically pressurized handgun.

DRY SHELLED PEAS

Application

Apply ZONE 4F herbicide as a broadcast soil application at the following timings: fall preplant (fall PP) or spring preplant (spring PP), preemergence (PRE) or preplant incorporated (PPI) for the control of broadleaf weeds and grasses in dry peas. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in a minimum of 10 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Dry Shelled Peas Fall Preplant, Spring Preplant, Preemergence and Preplant Incorporated Applications			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	2.25 – 3.0	3.0 – 4.5	3.0 – 4.5
1.5 – 3.0 %	3.0 – 4.5	3.75 – 6.0	4.5 – 6.0
>3%	3.75 – 6.0	4.5 – 6.75	5.25 – 8.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

Early Preplant and Fall Applications (EPP)

For use only in CO, ID, KS, MI, MN, MT, ND, NE, OR, SD, WA, WI, and WY

Apply ZONE 4F herbicide in the fall or spring as an EPP treatment to control or suppress weeds prior to planting the following spring. Apply to harvested crop stubble or soil surface and allow moisture from rainfall or snow to move the product into the soil. **DO NOT** mechanically incorporate in the fall or spring as this will destroy the herbicide barrier and allow weed escapes to occur. **DO NOT** apply to frozen soils or to existing snow cover to prevent ZONE 4F herbicide runoff from rain or snow melt that may occur following application. ZONE 4F herbicide may be tank mixed with other residual soil herbicides labeled for fall use on dry peas. If weeds are emerged at the time of ZONE 4F herbicide application, use a burndown herbicide such as glyphosate or paraquat at the full-labeled rate in combination with ZONE 4F herbicide or split application as needed. Select the appropriate rate from table above within the correct soil type and organic matter range. When using ZONE 4F herbicide in the fall, use a mid to high rate within the rate range for the appropriate soil type and organic matter.

Early Preplant (EPP) and Preemergence (PRE) - Spring Applications

Apply ZONE 4F herbicide pre-plant on the soil surface in the spring to control weeds in dry peas. ZONE 4F herbicide can be applied EPP prior to planting up to 3 days after planting as a PRE- soil application as long as seedlings have not broken the soil surface. Additionally the seed furrow must be completely closed to avoid severe crop injury. For PRE applications greater than 3 weeks prior to planting, use the high rate within the appropriate rate range for the soil and organic matter type listed in the use rate chart above table. ZONE 4F herbicide can be tank mixed with other PRE herbicides labeled for dry peas use. If dry conditions persist following PRE application of ZONE 4F herbicide, a shallow incorporation may be needed to incorporate and activate the herbicide. If weeds are emerged at the time of ZONE 4F herbicide application, use a burndown herbicide at the full-labeled rate in combination with ZONE 4F herbicide or split application as needed.

Preplant Incorporated (PPI)

Apply ZONE 4F herbicide as a PPI treatment in the spring prior to planting in reduced and conventional tillage in dry pea. **DO NOT** incorporate to depths greater than 2 inches. ZONE 4F herbicide can be tank mixed with other burndown such as glyphosate or paraquat or soil-applied herbicides labeled for use in dry pea. Use the full, recommended rates of burndown herbicides, or split applications as needed. Observe all precautions, instructions, and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.

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Weeds Controlled

When applied according to directions, ZONE 4F herbicide will provide control of:

Common lambsquarters
Common waterhemp
Eastern black nightshade
Ivyleaf morningglory
Kochia (ALS and Triazine Resistant)
Palmer amaranth
Prickly sida
Redstem filaree
Redroot pigweed
Russian thistle
Smooth pigweed
Tall morningglory
Tall waterhemp

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

Allow 7-14 days from application to planting when applying ZONE 4F herbicide to coarse textured soils. Best results are achieved with ZONE 4F herbicide when applications are made EPP and greater than 14 days before planting.

Under extended periods of dry weather, adequate weed control may not be achieved due to inadequate activation.

Adverse crop response may occur in the following conditions:

- on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.8 or higher
- on highly eroded soils
- in areas of calcareous outcroppings.

ZONE 4F herbicide use rates should be reduced in these areas.

Additionally adverse crop response may occur if:

- Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response.
- Poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases.

These Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all varieties or cultivars been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

DO NOT apply more than 8.0 fluid ounces (0.25 lb active) per acre of ZONE 4F herbicide in a single application.

DO NOT apply more than 8 fluid ounces (0.25 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.

DO NOT apply after crop emerges, or if the seedling is close to the soil surface.

DO NOT use on soils classified as sand, which have less than 1% organic matter.

DO NOT incorporate to depths greater than 2 inches.

DO NOT apply to frozen soils or to existing snow cover to prevent ZONE 4F herbicide runoff from rain or snow melt that may occur following application.

HORSERADISH

Application

Apply ZONE 4F herbicide as a broadcast soil application at the following timings: fall preplant (fall PP), spring pre-plant (spring PP), preemergence (PRE) or preplant incorporated (PPI) for the control of broadleaf weeds and grasses in horseradish. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in a minimum of 15 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Horseradish Fall Preplant, Spring Preplant, Preemergence and Preplant Incorporated Applications			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	2.25 – 4.5	3.0 – 4.5	3.0 – 4.5
1.5 – 3.0 %	4.5 – 6.0	6.0 – 8.0	6.0 – 8.0
>3%	6.0 – 7.5	6.0 – 8.0	6.0 - 8.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in horseradish. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

Fall or Spring Early Preplant (EPP)

MN, ND, SD, MT, CO, NE, WY, ID, WA, OR, WI, and MI Only

Apply ZONE 4F herbicide in the fall or spring preceding the growing season to control or suppress weeds prior to or up to the planting of horseradish. Applications may be made in the spring from 60 days prior to planting up to planting. Apply to harvested crop stubble or soil surface without incorporation. Moisture in the form of rain or snow is required to move and activate the product in the soil. **DO NOT** mechanically incorporate in the fall or spring after application as this destroys the herbicide barrier and weed escapes may occur. **DO NOT** apply to frozen soils to prevent ZONE 4F herbicide runoff from rain or snow that may occur following application. ZONE 4F herbicide may be tank mixed with other burndown herbicides to control emerged weeds in the fall or spring or with residual soil herbicides that are labeled for use on horseradish. Use full, recommended rates of burndown herbicides in combination with ZONE 4F herbicide, or split applications as needed. Observe all precautions, instructions, and rotational cropping guidelines of each product label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.

Preplant Incorporated (PPI)

Apply ZONE 4F herbicide as a PPI treatment in the spring prior to planting of horseradish. **DO NOT** incorporate to depths greater than 2 inches. ZONE 4F herbicide can be tank mixed with other burndown or soil-applied herbicides labeled for use on horseradish. Use the full, recommended rates of burndown herbicides or split applications as needed. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing including all references to potential carryover and crop injury warnings or restrictions.

Preemergence (PRE)

Apply ZONE 4F herbicide as a broadcast or banded treatment on horseradish. Applications should be made broadcast prior to planting, broadcast soon after planting but at least 5 days before crop emergence. May be applied as a banded treatment into the row middles after crop emergence. Use the higher ZONE 4F herbicide rates on clay soils and/or soils with greater than 1% organic matter. ZONE 4F herbicide may be applied with other pesticides registered for use on horseradish.

Horseradish Weeds Controlled

When applied according to directions, ZONE 4F herbicide will provide control of:

- Common lambsquarters
- Common waterhemp
- Ivyleaf morningglory
- Redroot pigweed
- Tall waterhemp
- Yellow nutsedge

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

These Horseradish Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all horseradish varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

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Restrictions

- **DO NOT** apply more than 8.0 fluid ounces (0.25 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 8 fluid ounces (0.25 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT** apply directly on the crop after the crop emerges or if the seedling sprouts are close to the soil surface.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** incorporate to depths greater than 2 inches.

LIMA BEANS (SUCCULENT) – For Use in Tennessee Only

Application

Apply ZONE 4F herbicide as a Preemergence (PRE) application by ground in succulent lima beans. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in a minimum of 10 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Lima Beans (Succulent) Preemergence Application			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	2.25 – 3.75	3.0 – 6.0	3.75 – 6.0
1.5 – 3.0 %	3.0 – 4.5	3.75 – 6.0	4.5 – 6.0
>3%	3.75 – 6.0	4.5 – 6.0	5.25 - 6.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			

Apply ZONE 4F herbicide to lima beans as a PRE treatment at 6.0 fluid ounces (0.1875 lb active) per acre. Applications should be made with ground equipment in a minimum of 10 gallons of finished spray per acre.

Lima Bean Weeds Controlled

When applied according to directions, ZONE 4F herbicide will provide control of:

Entireleaf morningglory
Hophornbeam copperleaf
Ivyleaf morningglory
Redroot pigweed
Smooth pigweed

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

When applying ZONE 4F herbicide to coarse textured soils, allow a minimum of 7-14 days from application to planting. Best results are achieved with ZONE 4F herbicide when applications are made EPP and greater than 14 days before planting.

Under extended periods of dry weather, adequate weed control may not be achieved.

Adverse crop response may occur in the following conditions:

- on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.8 or higher
- on highly eroded soils
- in areas of calcareous outcroppings.

ZONE 4F herbicide use rates should be reduced in these areas.

Additionally adverse crop response may occur if:

- Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response.
- Poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases.

Precautions

These Lima Bean Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all lima bean varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 6.0 fluid ounces (0.1875 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 6 fluid ounces (0.1875 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** incorporate.
- **DO NOT** apply using a mechanically pressurized handgun.

STRAWBERRY

Application

Apply ZONE 4F herbicide as a Preemergence (PRE) application by ground in strawberry. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in 10 to 40 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Strawberry Preemergence Application Dormant Application - IA, OH, MI and WA Only			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	4.0	4.0 – 4.5	4.0 – 6.0
1.5 – 3.0 %	4.0	4.0 – 8.0	4.0 – 8.0
>3%	4.0 – 8.0	4.0 – 8.0	4.0 – 8.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in strawberry. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.It is the pesticide user's responsibility to ensure that all products in the tested mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

Preemergence (PRE)

Apply ZONE 4F herbicide prior to planting and before seedlings have emerged. Application after crop emergence may cause severe injury to the crop. ZONE 4F herbicide can be applied alone or in combination with other labeled strawberry herbicides. ZONE 4F herbicide may be followed by labeled postemergence strawberry herbicides for increased control of grass and broadleaf weeds. Always follow the most restrictive label when tank mixing. When using this product in no-till or minimum till cropping systems, tank mix with an appropriate burndown herbicide for improved control of existing weeds.

Dormant Application (For Use only in the states of IA, OH, OR, MI, WA and WI)

ZONE 4F herbicide may be applied to dormant established plantings. Make sure the plants are in full dormancy before the dormant application is made. Application to strawberry plants with new emerged growth is not recommended due to leaf burning and possible stand loss. Do not apply within 56 days of harvest.

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Strawberry Weeds Controlled

When applied according to directions, ZONE 4F herbicide will provide control of:

- Chickweed
- Common lambsquarters
- Common groundsel
- Common waterhemp
- Corn spurry
- Field pansy
- Henbit
- Ivyleaf morningglory
- Mayweed
- Nightshade
- Pineapple weed
- Prostrate knotweed
- Redroot pigweed
- Sheperdspurse
- Sowthistle
- Tall waterhemp
- White campion
- Wild buckwheat
- Yellow nutsedge
- Yellow woodsorrel

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

These Strawberry Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all strawberry varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 8.0 fluid ounces (0.25 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 8 fluid ounces (0.25 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT** apply directly on the crop after the crop emerges or if the seedling sprouts are close to the soil surface.
- The minimum retreatment interval is 60 days.
- Apply using ground equipment only; do not use airblast sprayer or apply by air.

TOMATO – Transplanted Only

Application

Apply ZONE 4F herbicide as a broadcast or banded pre-transplant application in transplanted tomatoes. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in 10 to 40 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

File #: 83951_2 Art Order #: 405924 Item#: 207085-142
folder: file://lblmemart1/PRODUCTION/Products/800000/83951_2
Size: Vert: 6.7500" X Horz: 6.0000" _ _ _Date: 11/1/2022 Time: 14:19:08
colors: Black dieline
alt by: brittm _____DocuProof---Checked by:_____
code: No Code

ZONE 4F herbicide Use Rates for Tomatoes – Transplant Only Pre-transplant Application			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	2.25 – 3.0	3.0 – 4.5	3.0 – 6.0
1.5 – 3.0 %	3.0 – 6.0	6.0	6.0 – 8.0
>3%	6.0 – 8.0	8.0	8.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in tomato. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

Apply ZONE 4F herbicide as a broadcast or banded pre-transplant application in transplanted tomatoes. Applications must be made prior to transplanting. ZONE 4F herbicide may be tankmixed with other burndown or soil applied herbicides labeled for use in tomatoes. Use the full, recommended rates of burndown herbicides or split applications as needed. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing including all references to potential carryover and crop injury warnings or restrictions.

Tomato Weeds Controlled

When applied according to directions, ZONE 4F herbicide will provide control of:

- Common lambsquarters
- Common waterhemp
- Ivyleaf morningglory
- Redroot pigweed
- Tall waterhemp
- Yellow nutsedge

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

These Tomato Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all tomato varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 8.0 fluid ounces (0.25 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**

CROP SPECIFIC USE DIRECTIONS

OTHER CROPS

FLAX

Application

Apply ZONE 4F herbicide as a Preemergence (PRE) application in flax. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in a minimum of 10 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Flax Preemergence Application			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	2.25 -3.0	3.0 – 4.5	3.0 – 6.0
1.5 – 3.0 %	3.0 – 6.0	6.0 - 9.0	6.0 – 9.0
>3%	6.0 – 9.0	6.0 – 12.0	6.0 – 12.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in flax. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

Preemergence (PRE)

Apply ZONE 4F herbicide prior to planting to any time after planting but before seedlings have emerged. Application after crop emergence may cause severe injury to the crop.

ZONE 4F herbicide can be applied alone or in combination with other labeled flax herbicides. ZONE 4F herbicide may be followed by labeled postemergence flax herbicides for increased control of grass and broadleaf weeds. Always follow the most restrictive label when tank mixing. When using ZONE 4F herbicide in no-till or minimum till cropping systems, tank mix with an appropriate burndown herbicide for improved control of existing weeds.

Flax Weeds Controlled

When Applied according to directions, ZONE 4F herbicide will provide control of:

Eastern black nightshade
Entireleaf morningglory
Hophornbeam copperleaf
Kochia (ALS and Triazine Resistant)
Ivyleaf morningglory
Redroot pigweed
Smooth pigweed
Tall morningglory

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

When applying ZONE 4F herbicide to coarse textured soils, allow a minimum of 7-14 days from application to planting.

Under extended periods of dry weather, adequate weed control may not be achieved.

Adverse crop response may occur in the following conditions:

- on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.8 or higher
- on highly eroded soils
- in areas of calcareous outcroppings.

ZONE 4F herbicide use rates should be reduced in these areas.

Additionally adverse crop response may occur if:

- Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response.
- Poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases.

Precautions

These Flax Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all flax varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT** apply to frozen soils or existing snow cover to prevent ZONE 4F herbicide runoff from rain or snowmelt that may occur following application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** incorporate greater than 2 inches.
- **DO NOT** apply directly on the crop after the crop emerges or if the seedling sprouts are close to the soil surface.

MINT

Application

Apply ZONE 4F herbicide as a dormant application to established mint or as a PRE application to new plantings. Refer to the ZONE 4F herbicide Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate ZONE 4F herbicide rate from table below, in a minimum of 10 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

ZONE 4F herbicide Use Rates for Mint Preemergence Dormant or New Planting Applications			
Broadcast rate	**Fluid Ounces of ZONE 4F herbicide per Acre**		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	4.5 – 6.0	6.0- 8.0	8.0
1.5 – 3.0 %	6.0 – 8.0	8.0 – 10.1	10.1
>3%	8.0 – 10.1	10.1 – 12.0	12.0
Coarse = Sand, Loamy Sand, Sandy Loam Medium = Sandy Clay Loam, Sandy Clay, Loam, Silt Loam, Silt Fine = Silty Clay Loam, Silty Clay, Clay Loam, Clay			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in mint. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.			

Dormant Applications

Apply ZONE 4F herbicide to established stands of dormant mint after post-harvest and/or spring land cultivation has been completed but before emergence of new mint growth. Split applications of ZONE 4F herbicide may be used for preemergence control of winter annuals and summer annuals. Fall applications must be applied after post-harvest cultivation has been completed and spring application made after spring cultivation has been completed but before emergence of new mint growth. Apply ZONE 4F herbicide in tank-mixtures with a registered burndown herbicide to control emerged weeds at the time of application. A surfactant is recommended with these tank mixtures to improve control of the emerged weeds. ZONE 4F herbicide may also be applied in tank mixtures with other products registered for use in mint.

New Planting Applications

Apply ZONE 4F herbicide as a PRE-treatment to new mint plantings preemergence to the weeds and mint. Reduce the rate of application approximately twenty five percent of the rate recommended for established plantings for particular soil characteristics. Refer to Use Rate Table above for the appropriate use rate for the soil type and organic matter content. The higher rates in the range are recommended for soils of pH less than 7.0.

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colors: Black dieline
alt by: brittm _____DocuProof---Checked by:_____
code: No Code

Mint Weeds Controlled

When Applied according to directions, ZONE 4F herbicide will provide control of:

- Catchweed Bedstraw
- Common lambsquarters
- Common waterhemp
- Eastern black nightshade
- Kochia (ALS and Triazine Resistant)
- Mayweed chamomile
- Ivyleaf morningglory
- Powell pigweed
- Redroot pigweed
- Russian thistle
- Sheperdspurse
- Tall waterhemp
- Yellow nutsedge
- Yellow toadflax

For information on other weeds not listed above, refer to Weed Controlled section in this label.

Precautions

Emerged mint plants that are exposed to application will result in severe injury to exposed plant tissue. Applications should only be made to healthy mint fields. Application to unhealthy/stressed field may result in mint injury.

Moisture in the form of rainfall or overhead irrigation is required after application to activate the herbicide

These Mint Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

NOTE: Not all mint varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- Apply ZONE 4F herbicide only to dormant or new plantings of mint before new growth emerges.

CROP SPECIFIC USE DIRECTIONS - PERMANENT CROPS

APPLES

APPLICATION INFORMATION

Apply ZONE 4F herbicide as a uniform broadcast soil application to orchard floors or a uniform banded application directed to the base of the tree trunks for preemergence (PRE) control of the weeds listed below. Use a minimum of 10 gallons of spray solution per acre to ensure uniform spray coverage. Nozzle selection should meet manufacturer's spray volume and pressure recommendations for preemergence and postemergence herbicide applications. Apply sufficient spray volume to achieve adequate coverage. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets.

ZONE 4F herbicide Use Rates for Permanent Crops Apples
Fluid Ounces of ZONE 4F herbicide per Acre
4 – 12 fluid ounces (0.125 – 0.375 lb ai/A)
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in Permanent Crops. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

For improved weed management ZONE 4F herbicide can be applied in a tank mixture with other preemergence and postemergence burndown herbicides. Refer to the tank mix partners labels for additional restrictions including minimum spray volumes and crops in which they are labeled. Burndown herbicides may include but are not limited to glyphosate, Paraquat, Rely and 2,4-D. **DO NOT** tank mix with Chateau® herbicides (flumioxazin) or with other products containing sulfentrazone.

When applied as a banded treatment (50% band or less) refer to formula in chart below for rate and volume. ZONE 4F herbicide may be applied twice per year. Allow a minimum of 60 days between applications unless otherwise specified on the label or separate published Helm Agro recommendations.

File #: 83951_2 Art Order #: 405924 Item#: 207085-142
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colors: Black dieline
alt by: brittm _____DocuProof---Checked by:_____
code: No Code

For band treatments apply the broadcast equivalent rate and volume per acre. To determine these:

(Banded Width in Feet/ Row Width in Feet) X Broadcast Rate Per Acre = Band Rate

Band Width in Feet X Broadcast Volume Per Acre = Band Volume

A minimum of 10 gallons of spray solution per acre should be used to ensure uniform spray coverage. Nozzle selection should meet manufacturers spray volume and pressure recommendations for preemergence and postemergence herbicide applications. The spray solution should have a pH between 5.0 and 9.0.

Apply ZONE 4F herbicide only be to crops that have been established for one full growing season and are in good health and exhibit hood vigor. Avoid allowing spray to come in contact with green bark or green tissue of trunks of young vines and trees by wrapping the trunk with a nonporous wrap, grow tubes or wax containers. Failure to do so may result in severe crop injury. Avoid direct or indirect spray contact with crop foliage and fruit.

Use ground equipment only **DO NOT** apply using an airblast sprayer or by air. **DO NOT** apply using pressurized handgun.

Best results will be obtained when the soil is moist at the time of application and the application will be followed by at least 4 inch of rainfall or sprinkler irrigation within two weeks after application. Applications should be timed to take advantage of normal rainfall patterns and cool temperatures especially where drip or micro sprinkler irrigation is used which may not uniformly incorporate the herbicide.

ZONE 4F herbicide is a selective soil applied herbicide for the control of susceptible broadleaf grass and sedge weeds found in Apple Weed List below. At least 0.5 inch of moisture is required within 14 days after application for optimal control. If adequate rainfall is not received in a timely fashion, irrigate with a minimum of 0.5 inch of irrigation. If activating moisture is delayed a reduced level of weed control may occur. These escaped weeds can be removed using a postemergence burndown herbicide.

When weeds are present at the time of application, tank mix ZONE 4F herbicide with a burndown herbicide and use an appropriate adjuvant. Refer to the tank mix partners product label for the proper use rates by weed sizes. Use the most restrictive label limitations and precautions of the tank mix product(s).

Residual weed control may be reduced when ZONE 4F herbicide is applied where heavy crop trash such as leaves and branches and/or weed residues exists. Prior to the ZONE 4F herbicide application it is best to rake or blow off the leaves and trash when they fall so the spray solution can reach soil surface.

DO NOT apply after petal fall unless using a hooded or shielded sprayer to ensure that the spray solution will not come in contact with the crop or foliage.

Permanent Crop Weed List	
Amaranth, livid	*Amaranthus lividus*
Amaranth, Palmer	*Amaranthus palmeri*
Amaranth, Powell	*Amaranthus Powell II*
Amaranth, spiny	*Amaranthus spinosus*
Amaranth, spleen	*Amaranthus dubius*
Anoda, spurred	*Anoda cristata*
Barnyardgrass, common	*Echinochloa crus-galli*
Bedstraw, catchweed	*Galium aparine*
Bindweed, field	*Convolvulus arvensis*
Bluegrass, annual	*Poa annua*
Bromegrass species	*Bromus spp.*
Burclover, California	*Medicago polymorpha*
Carpetweed	*Mollugo verticillata*
Cheatgrass	*Bromus tectorum*
Cheeseweed species	*Malva spp.*
Chickweed, common	*Stellaria media*
Clover species	*Trifolium spp.*
Copperleaf, hophornbeam	*Acalypha ostryeafolia*
Copperleaf, Virginia	*Acalypha virginica*
Crabgrass, large	*Digitaria sanguinalis*
Crabgrass, smooth	*Digitaria ischaemum*
Crabgrass, Southern	*Digitaria ciliaris*
Croton, tropic	*Croton glandulosus*
Crownbeard, golden	*Verbesina encelioides*

(continued)

Permanent Crop Weed List *(continued)*	
Cupgrass, wooly	*Amaranthus lividus*
Cyperus, hedgehog	*Cyperus compressus*
Daisy, American	*Eclipta alba*
Devilsclaw	*Proboscidea louisiana*
Dock, curly	*Rumex crispus*
Eclipta	*Eclipta prostrata*
Eveningprimrose, cutleaf	*Oenothera laciniata*
Fescue, Red	*Fetuca rubra*
Fiddleneck speicies	*Amsinckia spp.*
Filaree, broadleaf	*Eroduim botrys*
Filaree, redstem	*Erodium cicutarium*
Filaree, whitestem	*Erodium moschatum*
Fleabane, hairy	*Conyza bonariensis*
Flixweed	*Descurainia sophia*
Foxtail, bristly	*Setari verticillata*
Foxtail, giant	*Setaria faberi*
Foxtail, green	*Setaria viridis*
Foxtail, yellow	*Setaria glauca*
Galinsoga, hairy	*Galinsoga ciliata*
Goosegrass	*Eleusine indica*
Goosefoot, nettleleaf	*Chenopodium murale*
Groundcherry, clammy (seedling)	*Physalis heterophylla*
Groundcherry, cutleaf	*hysalis angulata*
Groundsel, common	*Senecio vulgaris*
Henbit	*Lamium amplexicaule*
Ryegrass, Italian	*Lolium multiflorum*
Jimsonweed	*Datura stramonium*
Johnsongrass	*Sorghum halpense*
Junglerice	*Enchinochloa colona*
Knotweed, common	*Polygonum arenastrum*
Kochia (ALS and Triazine Resistant)	*Kochia scoparia*
Ladysthumb	*Polygonum persicaria*
Lambsquarters, common	*Chenopodium album*
Lettuce, miners	*Montia perfoliata*
Lovegrass species	*Eragrostis spp.*
Mallow, common	*Malva neglecta wall r.*
Mallow, little	*Malva parviflora*
Mayweed, Chamomile	*Anthemis cotula l.*
Milkweed, honeyvine	*Ampelamus albidus*

(continued)

Permanent Crop Weed List *(continued)*	
Morningglory, entireleaf	*Ipomoea hederacea integriuscula*
Morningglory, ivyleaf	*Ipomoea hederacea hederacea*
Morningglory, palmleaf	*Ipomoea wrightii*
Morningglory, purple	*Ipomoea turbinata*
Morningglory, red	*Ipomoea, coccinea L.*
Morningglory, scarlet	*Ipomoea coccinea*
Morningglory, smallflower	*Jacquemontia tamnifolia*
Morningglory, tall	*Ipomoea, purpurea*
Mullein, turkey	*Eremocarpus setigerus*
Mustard, Species	*Brassica spp.*
Mustard, tumble	*Sisybrium altissimum*
Nettle, burning	*Urtica urens*
Nightshade, black	*Solanum nigrum*
Nightshade, Eastern black	*Solanum ptycanthum*
Nutsedge, purple	*Cyperus rotundus*
Nutsedge, yellow	*Cyperus esculentus*
Orchardgrass	*Dactylis glomerata*
Panicum, fall	*Panicum dichotomiflorum*
Pigweed, prostrate	*Amaranthus blitoides*
Pigweed, redroot	*Amaranthus retroflexus*
Pigweed, smooth	*Amaranthus hybridus*
Pigweed, Tumble	*Amaranthus albus*
Pineapple-weed	*Chamomilla suaveolens*
Plantain, blackseed	*Plantago rugelii decne*
Plantain, narrow-leaved	*Plantago lanceolata*
Plantain, narrow-leaved	*Plantago lanceolata*
Poorjoe	*Diodia teres*
Porophyllum	*Porophyllum rederale*
Poinsettia, wild	*Euphorbia heterophylla*
Puncturevine	*Tribulus terrestris*
Purslane, common	*Portulaca oleracea*
Redmaids	*Calandrinia ciliata*
Redweed	*Melochia corchorifolia*
Radish, Wild	*Raphanus raphanistrum*
Rocket, London	*Sisymbrium irio*
Sandbur	*Cenchrus spinifer*
Sedge, annual	*Carex spp.*
Senna, coffee	*Cassia occidentalis*
Sheperdspurse	*Capsella bursa-pastoris*

(continued)

Permanent Crop Weed List *(continued)*	
Sida, prickly	*Sida spinosa*
Sida, Southern	*Sida acuta*
Signalgrass, broadleaf	*Brachiaria platyphylla*
Smartweed, PA (seedling)	*Polygonum pensylvanicum*
Smellmellon	*Cucumis melo*
Sowthistle species	*Sonchus spp.*
Srangletop, red	*Leptochloa filiformis*
Spurge, spotted	*Chamaesyce maculate*
Starbur, bristly	*Acanthospermum hispidum*
Stinkgrass	*Eragrostis cilianensis*
Toadflax, yellow	*Linaria vulgaris*
Tassleflower, red	*Emilio sonchifolia*
Thistle, Russian	*Salsola kali*
Waterhemp, common	*Amaranthus rudis*
Waterhemp, tall	*Amaranthus tuberculatos*
Waterprimrose, winged	*Ludwigia decurrens*
Willowleaf, panicle-leaf	*Epilobium brachycarpum*
Witchgrass	*Panicum capillare*

ANNUAL AND PERENNIAL SEDGE CONTROL INCLUDING NUTSEDGE

Applying ZONE 4F herbicide at 12 fluid ounces per acre (0.375 lb ai/A) may provide control or suppression of sedges whether applied preemergence or postemergence to the sedges. Soil uptake is the major means of uptake by sedges. Postemergence applications to sedges allow ZONE 4F herbicide to be taken into the sedge through the foliage as well as soil uptake through the roots. Good spray coverage is required for optimum control of sedges especially when applying postemergence to the sedges. Use a quality nonionic surfactant (NIS) at the rate of 0.25% v/v when applying postemergence.

When applied as directed, ZONE 4F herbicide will provide control or suppressionof the following sedges.	
Common Name	**Scientific Name**
Kyllinga, green	*Kyllinga gracillima*
Kyllinga, false green	*Kyllinga gracillima*
Nutsedge, purple	*Cyperus rotundus*
Nutsedge, yellow	*Cyperus esculentus*
Sedge, cylindrical	*Cyperus retrorsus*
Sedge, globe	*Cyperus globulosus*
Sedge, Surinam	*Cyperus surinamensis*
Sedge, Texas	*Cyperus polystachyos*

Split applications of ZONE 4F herbicide may optimize purple nutsedge. Apply 4-6 fluid ounces per acre followed by a second application to actively growing purple nutsedge. **DO NOT** exceed the maximum rate of 12 fluid ounces (0.375 lb ai/A) per season. ZONE 4F herbicide symptoms on purple nutsedge include reduced nutsedge stands, necrosis, chlorosis, and/or stunting. Optimum control may not be observed until the second year after the original treatment.

REPLANTING IN NEW OR ESTABLISHED ORCHARDS AND VINEYARDS

Delay replanting replacement trees and vines for at least 30 days after ZONE 4F herbicide applications in newly planted and established orchards and vineyards. Use untreated soil when replanting trees and vines.

Precautions

These Apple Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use. Helm Agro does not recommend tank mixing this product with other products containing sulfentrazone or other group 14 herbicides as crop injury may occur.

NOTE: Not all apple varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT** apply more than 12 fluid ounces (0.375 pound active) per season.
- **DO NOT** apply ZONE 4F herbicide using airblast sprayers or by air.
- **DO NOT** apply using a mechanically pressurized handgun. Use ground equipment only.
- **DO NOT** apply after petal fall unless using a hooded or shielded sprayer to ensure that the spray solution will not carry in contact with the crop or foliage.
- Apply to crops that have been growing for at least 1 year and are in good condition.
- Avoid direct or indirect spray contact to foliage and green bark (wrap trunk with non-porous wrap, grow tubes, or wax containers to keep spray solution off of green tissue).
- **DO NOT** apply to powdery soils or soils where wind may displace the soil, unless irrigation can be applied immediately after application.
- Follow the most restrictive label of tank mix partners including all references to potential carryover and crop injury warnings and restrictions.
- Pre-harvest Interval (PHI): 14 days
- If two banded treatments are made in a growing season, allow a minimum of 60 days between applications, however, **DO NOT** exceed the seasonal maximum use rate.

CITRUS FRUIT, TREE NUTS, GRAPES and BERRIES

Citrus Fruits

Lemon, Orange, Sour orange

Preharvest Interval: 3 days

Grapes

Juice, Table, Raisin, Wine

Preharvest Interval: 3 days

Berries

Aronia berry, , Blackberry (including Andean blackberry), Boysenberry, , Dewberry, Loganberry, Olallieberry, Youngberry, Blueberry, Highbush; Blueberry, Lowbush; Chilean guava; Cranberry, Highbush; Currant, black; Currant, red; Elderberry; European barberry; Gooseberry; Honeysuckle, edible; Huckleberry; Jostaberry; Juneberry (Saskatoon berry); Lingonberry; Native currant; Raspberry, black and red; Salal; Sea buckthorn;

Preharvest interval 3 days

Tree Nuts

Pistachio and Walnut (Black and English)

Preharvest interval 3 days

APPLICATION INFORMATION

Apply ZONE 4F herbicide as a uniform broadcast soil application to orchard and vineyard floors, to berry beds and furrows or as a uniform band application directed to the base of the trunk in trees and vines and to the base of the berry and beds in berrys to provide preemergence control of weeds in the Permanent Crop Weed List. Best control with ZONE 4F herbicide is obtained when there are no weeds present at the time of application. If weeds are present, tank mix with a postemergence herbicide to eliminate emerged weeds. Broadcast or band apply the appropriate ZONE 4F herbicide rate from table below, in a minimum of 10 gallons of finished spray per acre. Apply sufficient spray volume to achieve adequate coverage. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets.

ZONE 4F herbicide Use Rates for Permanent Crops Citrus Fruit, Tree Nuts, Grapes and Berries
Fluid Ounces of ZONE 4F herbicide per Acre
4 – 12 fluid ounces (0.125 – 0.375 lb ai/A)
ZONE 4F herbicide may be tank mixed with other herbicides registered for use in Permanent Crops.

For improved weed management ZONE 4F herbicide can be applied in a tank mixture with other preemergence and postemergence burndown herbicides. Refer to the tank mix partners labels for additional restrictions including minimum spray volumes and crops in which they are labeled. Burndown herbicides may include but are not limited to glyphosate, Paraquat, Rely and 2,4-D. **DO NOT** tank mix with Chateau® herbicides (flumioxazin) or with other products containing sulfentrazone.

When applied as a banded treatment (50% band or less) refer to formula in chart below for rate and volume. ZONE 4F herbicide may be applied twice per year. Allow a minimum of 60 days between applications unless otherwise specified on the label or separate published Helm Agro recommendations.

For band treatments apply the broadcast equivalent rate and volume per acre. To determine these:

(Banded Width in Feet/ Row Width in Feet) X Broadcast Rate Per Acre = Band Rate

Band Width in Feet X Broad cast Volume Per Acre = Band Volume

A minimum of 10 gallons of spray solution per acre should be used to ensure uniform spray coverage. Nozzle selection should meet manufacturers spray volume and pressure recommendations for preemergence and postemergence herbicide applications. The spray solution should have a pH between 5.0 and 9.0.

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Apply ZONE 4F herbicide only be to crops that have been established for one full growing season and are in good health and exhibit hood vigor. Avoid allowing spray to come in contact with green bark or green tissue of trunks of young vines and trees by wrapping the trunk with a nonporous wrap, grow tubes or wax containers. Failure to do so may result in severe crop injury. Avoid direct or indirect spray contact with crop foliage and fruit.

Use ground equipment only **DO NOT** apply using an airblast sprayer or by air.

Best results will be obtained when the soil is moist at the time of application and the application will be followed by at least 4 inch of rainfall or sprinkler irrigation within two weeks after application. Applications should be timed to take advantage of normal rainfall patterns and cool temperatures especially where drip or micro sprinkler irrigation is used which may not uniformly incorporate the herbicide.

ZONE 4F herbicide is a selective soil applied herbicide for the control of susceptible broadleaf grass and sedge weeds found in Permanent Crop Weed List below. At least 0.5 inch of moisture is required within 14 days after application for optimal control. If adequate rainfall is not received in a timely fashion irrigate with a minimum of 0.5 inch of irrigation. If activating moisture is delayed a reduced level of weed control may occur. These escaped weeds can be removed using a postemergence burndown herbicide.

When weeds are present at the time of application, tank mix ZONE 4F herbicide with a burndown herbicide and use an appropriate adjuvant. Refer to the tank mix partners product label for the proper use rates by weed sizes. Use the most restrictive label limitations and precautions of the tank mix product(s).

Residual weed control may be reduced when ZONE 4F herbicide is applied where heavy crop trash such as leaves and branches and/or weed residues exists. Prior to the ZONE 4F herbicide application it is best to rake or blow off the leaves and trash when they fall so the spray solution can reach soil surface.

Do not apply after petal fall unless using a hooded or shielded sprayer to ensure that the spray solution will not come in contact with the crop or foliage.

Restrictions

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT** apply using airblast sprayer or by air.
- **DO NOT** apply after petal fall unless using a hooded or shielded sprayer to ensure that the spray solution will not carry in contact with the crop or foliage.
- **DO NOT** apply using a mechanically pressurized handgun.

Permanent Crop Weed List	
Amaranth, livid	*Amaranthus lividus*
Amaranth, Palmer	*Amaranthus palmeri*
Amaranth, Powell	*Amaranthus Powell II*
Amaranth, spiny	*Amaranthus spinosus*
Amaranth, spleen	*Amaranthus dubius*
Anoda, spurred	*Anoda cristata*
Barnyardgrass, common	*Echinochloa crus-galli*
Bedstraw, catchweed	*Galium aparine*
Bindweed, field	*Convolvulus arvensis*
Bluegrass, annual	*Poa annua*
Bromegrass species	*Bromus spp.*
Burclover, California	*Medicago polymorpha*
Carpetweed	*Mollugo verticillata*
Cheatgrass	*Bromus tectorum*
Cheeseweed species	*Malva spp.*
Chickweed, common	*Stellaria media*
Clover species	*Trifolium spp.*
Copperleaf, hophornbeam	*Acalypha ostryeafolia*
Copperleaf, Virginia	*Acalypha virginica*
Crabgrass, large	*Digitaria sanguinalis*
Crabgrass, smooth	*Digitaria ischaemum*
Crabgrass, Southern	*Digitaria ciliaris*

(continued)

Permanent Crop Weed List *(continued)*	
Croton, tropic	*Croton glandulosus*
Crownbeard, golden	*Verbesina encelioides*
Cupgrass, wooly	*Amaranthus lividus*
Cyperus, hedgehog	*Cyperus compressus*
Daisy, American	*Eclipta alba*
Devilsclaw	*Proboscidea louisiana*
Dock, curly	*Rumex crispus*
Eclipta	*Eclipta prostrata*
Eveningprimrose, cutleaf	*Oenothera laciniata*
Fescue, Red	*Fetuca rubra*
Fiddleneck speicies	*Amsinckia spp.*
Filaree, broadleaf	*Eroduim botrys*
Filaree, redstem	*Erodium cicutarium*
Filaree, whitestem	*Erodium moschatum*
Fleabane, hairy	*Conyza bonariensis*
Flixweed	*Descurainia sophia*
Foxtail, bristly	*Setari verticillata*
Foxtail, giant	*Setaria faberi*
Foxtail, green	*Setaria viridis*
Foxtail, yellow	*Setaria glauca*
Galinsoga, hairy	*Galinsoga ciliata*
Goosegrass	*Eleusine indica*
Goosefoot, nettleleaf	*Chenopodium murale*
Groundcherry, clammy (seedling)	*Physalis heterophylla*
Groundcherry, cutleaf	*hysalis angulata*
Groundsel, common	*Senecio vulgaris*
Henbit	*Lamium amplexicaule*
Ryegrass, Italian	*Lolium multiflorum*
Jimsonweed	*Datura stramonium*
Johnsongrass	*Sorghum halpense*
Junglerice	*Enchinochloa colona*
Knotweed, common	*Polygonum arenastrum*
Kochia (ALS and Triazine Resistant)	*Kochia scoparia*
Ladysthumb	*Polygonum persicaria*
Lambsquarters, common	*Chenopodium album*
Lettuce, miners	*Montia perfoliata*
Lovegrass species	*Eragrostis spp.*
Mallow, common	*Malva neglecta wall r.*
Mallow, little	*Malva parviflora*

(continued)

Permanent Crop Weed List *(continued)*	
Mayweed, Chamomile	*Anthemis cotula l.*
Milkweed, honeyvine	*Ampelamus albidus*
Morningglory, entireleaf	*Ipomoea hederacea integriuscula*
Morningglory, ivyleaf	*Ipomoea hederacea hederacea*
Morningglory, palmleaf	*Ipomoea wrightii*
Morningglory, purple	*Ipomoea turbinata*
Morningglory, red	*Ipomoea, coccinea L.*
Morningglory, scarlet	*Ipomoea coccinea*
Morningglory, smallflower	*Jacquemontia tamnifolia*
Morningglory, tall	*Ipomoea, purpurea*
Mullein, turkey	*Eremocarpus setigerus*
Mustard, Species	*Brassica spp.*
Mustard, tumble	*Sisybrium altissimum*
Nettle, burning	*Urtica urens*
Nightshade, black	*Solanum nigrum*
Nightshade, Eastern black	*Solanum ptycanthum*
Nutsedge, purple	*Cyperus rotundus*
Nutsedge, yellow	*Cyperus esculentus*
Orchardgrass	*Dactylis glomerata*
Panicum, fall	*Panicum dichotomiflorum*
Pigweed, prostrate	*Amaranthus blitoides*
Pigweed, redroot	*Amaranthus retroflexus*
Pigweed, smooth	*Amaranthus hybridus*
Pigweed, Tumble	*Amaranthus albus*
Pineapple-weed	*Chamomilla suaveolens*
Plantain, blackseed	*Plantago rugelii decne*
Plantain, narrow-leaved	*Plantago lanceolata*
Poorjoe	*Diodia teres*
Porophyllum	*Porophyllum rederale*
Poinsettia, wild	*Euphorbia heterophylla*
Puncturevine	*Tribulus terrestris*
Purslane, common	*Portulaca oleracea*
Redmaids	*Calandrinia ciliata*
Redweed	*Melochia corchorifolia*
Radish, Wild	*Raphanus raphanistrum*
Rocket, London	*Sisymbrium irio*
Sandbur	*Cenchrus spinifer*
Sedge, annual	*Carex spp.*
Senna, coffee	*Cassia occidentalis*

(continued)

Permanent Crop Weed List *(continued)*	
Sheperdspurse	*Capsella bursa-pastoris*
Sida, prickly	*Sida spinosa*
Sida, Southern	*Sida acuta*
Signalgrass, broadleaf	*Brachiaria platyphylla*
Smartweed, PA (seedling)	*Polygonum pensylvanicum*
Smellmellon	*Cucumis melo*
Sowthistle specie	*Sonchus spp.*
Srangletop, red	*Leptochloa filiformis*
Spurge, spotted	*Chamaesyce maculate*
Starbur, bristly	*Acanthospermum hispidum*
Stinkgrass	*Eragrostis cilianensis*
Toadflax, yellow	*Linaria vulgaris*
Tassleflower, red	*Emilio sonchifolia*
Thistle, Russian	*Salsola kali*
Waterhemp, common	*Amaranthus rudis*
Waterhemp, tall	*Amaranthus tuberculatos*
Waterprimrose, winged	*Ludwigia decurrens*
Willowleaf, panicle-leaf	*Epilobium brachycarpum*
Witchgrass	*Panicum capillare*

ANNUAL AND PERENNIAL SEDGE CONTROL INCLUDING NUTSEDGE

Applying ZONE 4F herbicide at 12 fluid ounces per acre (0.375 lb ai/A) may provide control or suppression of sedges whether applied preemergence or postemergence to the sedges. Soil uptake is the major means of uptake by sedges. Postemergence applications to sedges allow ZONE 4F herbicide to be taken into the sedge through the foliage as well as soil uptake through the roots. Good spray coverage is required for optimum control of sedges especially when applying postemergence to the sedges. Use a quality nonionic surfactant (NIS) at the rate of 0.25% v/v when applying postemergence.

When applied as directed, ZONE 4F herbicide will provide control or suppression of the following sedges.	
Common Name	**Scientific Name**
Kyllinga, green	*Kyllinga brevifolia*
Kyllinga, false green	*Kyllinga gracillima*
Nutsedge, purple	*Cyperus rotundus*
Nutsedge, yellow	*Cyperus esculentus*
Sedge, cylindrical	*Cyperus retrorsus*
Sedge, globe	*Cyperus globulosus*
Sedge, Surinam	*Cyperus surinamensis*
Sedge, Texas	*Cyperus polystachyos*

Split applications of ZONE 4F herbicide may optimize purple nutsedge. Apply 4-6 fluid ounces per acre followed by a second application to actively growing purple nutsedge. **DO NOT** exceed the maximum rate of 12 fluid ounces (0.375 lb ai/A) per season. ZONE 4F herbicide symptoms on purple nutsedge include reduced nutsedge stands, necrosis, chlorosis, and/or stunting. Optimum control may not be observed until the second year after the original treatment.

REPLANTING IN NEW OR ESTABLISHED ORCHARDS AND VINEYARDS

Delay replanting replacement trees and vines for at least 30 days after ZONE 4F herbicide applications in newly planted and established orchards and vineyards. Use untreated soil when replanting trees and vines.

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Precautions

These Crop Specific Use directions are based upon the interactive effects of sulfentrazone – the active ingredient in ZONE 4F herbicide- and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, ZONE 4F herbicide Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use. Helm Agro does not recommend tank mixing this product with other products containing sulfentrazone or other group 14 herbicides as crop injury may occur.

NOTE: Not all Citrus Fruit, Tree Nuts, Grapes and Berry varieties or cultivars have been evaluated under treatment with ZONE 4F herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on ZONE 4F herbicide under specific local conditions.

Restrictions

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide per application or per twelve-month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- **DO NOT** apply more than 12 fluid ounces (0.375 pound active) per season.
- **DO NOT** apply ZONE 4F herbicide using airblast sprayers or by air. **DO NOT** apply using a mechanically pressurized handgun. Use ground equipment only. **DO NOT** apply after petal fall unless using a hooded or shielded sprayer to ensure that the spray solution will not carry in contact with the crop or foliage.
- Apply to crops that have been growing for at least 1 year and are in good condition.
- Avoid direct or indirect spray contact to foliage and green bark (wrap trunk with non-porous wrap, grow tubes, or wax containers to keep spray solution off of green tissue).
- **DO NOT** apply to powdery soils or soils where wind may displace the soil, unless irrigation can be applied immediately after application.
- Follow the most restrictive label of tank mix partners including all references to potential carryover and crop injury warnings and restrictions.
- Pre-harvest Interval (PHI): 3 days
- If two banded treatments are made in a growing season, allow a minimum of 60 days between applications, however, **DO NOT** exceed the seasonal maximum use rate.

RIGHTS-OF WAYS - INCLUDING RAILROAD, HIGHWAY, ROADSIDE, PIPELINE, UTILITY, INDUSTRIAL AREAS, FENCE ROWS AND OTHER LISTED NON-CROP SITES

Application

Apply ZONE 4F herbicide to the following sites:

- Railroad rights-of-way, including railroad yards, railroad crossings and railroad bridge abutments to control weeds and maintain bare ground.
- Highway, roadside, pipeline and utility rights-of-way. Such areas would include, but are not limited to, guard rails, road shoulders, electric utility substations, pipeline pumping stations, around electric transmission towers, around distribution line poles and in other areas where complete vegetation control is desired.
- Industrial areas including production facilities, tank farms, storage areas, parking areas, lumber yards, airports, military installations, along fence rows, and in similar non-crop sites where complete vegetation control is needed.
- Apply alone or in combination with other herbicides for residual control of weeds in early Spring, late Summer or Fall, or early Spring to insure adequate moisture for soil activation.

Method and Rate of Application

Apply this product as a broadcast treatment at 8 to 12 fluid ounces (0.25 to 0.375 lb active ingredient) per acre by ground in a minimum of 10 gallons of spray solution per acre for residual control of germinating weeds in non-crop land. Applications may be made by helicopter on railroad rights-of-way only.

Use labeled rates of burndown herbicides such as glyphosate, diquat, 2,4-D, dicamba, etc. as tank mixtures with ZONE 4F herbicide. Use recommended adjuvants for the herbicide tank mix partner. Refer to the specific product labels for all restrictions on tank mixing and observe all label precautions, instructions and rotational cropping restrictions for all products used in tank mixes.

- **DO NOT** apply more than 12.0 fluid ounces (0.375 lb active) per acre of ZONE 4F herbicide in a single application.
- **DO NOT** apply more than 12 fluid ounces (0 375 lb active) per acre of ZONE 4F herbicide per twelve month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.

Railroads Right-Of-Way Crop Weed List	
Amaranth, Palmer	*Amaranthus palmeri*
Beggarweed, Florida	*Desmodium tortuosum*
Carpetweed	*Mollugo verticillata*
Chickweed, common	*Stellaria media*
Copperleaf, hophornbeam	*Acalypha ostryeafolia*
Crabgrass species	*Digitaria spp.*
Croton, tropic	*Croton glandulosus*
Daisy, American	*Coreopsis grandiflora*
Dayflower, common	*Commelina communis*

(continued)

Railroads Right-Of-Way Crop Weed List	
Dayflower, Virginia	*Commelina virginica*
Dock, curly	*Rumex crispus*
Flixweed	*Descurainia sophia*
Galinsoga, hairy	*Galinsoga ciliata*
Groundcherry, clammy (seedling)	*Physalis heterophylla*
Groundcherry, cutleaf	*Physalis angulata*
Jimsonweed	*Datura stramonium*
Kochia (ALS and Triazine Resistant)	*Kochia scoparia*
Lambsquarters, common	*Chenopodium album*
Lettuce, wild	*Lactuca virosa*
Mallow, common	*Malva neglecta wall r.*
Mayweed, Chamomile	*Anthemis cotula l.*
Mexicanweed	*Caperonia castanifolia*
Milkweed, honeyvine	*Ampelamus albidus*
Morningglory species	*Ipomoea spp.*
Mustard, species	*Brassica spp.*
Nightshade species	*Solanum spp.*
Nutsedge speices	*Cyperus spp.*
Pigweed, redroot	*Amaranthus retroflexus*
Pigweed, smooth	*Amaranthus hybridus*
Texasweed	*Caperonia palustrus*
Thistle, Russian	*Salsola iberica*
Waterhemp, common	*Amaranthus rudis*
Waterhemp, tall	*Amaranthus tuberculatos*

Restrictions

- **DO NOT** apply ZONE 4F herbicide to soils classified as sand with less than 1% Organic Matter.
- **DO NOT** apply more than 12 fluid ounces (0 375 lb active) per acre of ZONE 4F herbicide per twelve month period. The twelve month period is considered to begin upon the initial ZONE 4F herbicide application.
- Application by helicopter can only be made to railroad rights of way.

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STORAGE AND DISPOSAL

DO NOT contaminate water, food or feed by storage or disposal or cleaning of equipment.

Pesticide Storage and Disposal

Store product in original container only. Keep container closed when not in use, away from food or feed, fertilizer and other pesticides. Store in a cool dry place and avoid excess heat. DO NOT store below 30°F degrees. Wastes resulting from the use of this product that cannot be used should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, State or local procedures. For more information contact your State Pesticide or Environmental Control Agency or the Hazardous Waste representative of the nearest EPA Regional Office for guidance.

Container Handling

Nonrefillable container - **DO NOT** reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: (For containers greater than 5 gallons) 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. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. (For containers 5 gallons or less) 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. Triple rinse (or equivalent). Then offer for recycling if available, or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Returnable/Refillable Containers - Refill this container with ZONE 4F herbicide only. **DO NOT** reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

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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.

Follow Directions for Use of this product carefully. It is impossible to eliminate all risks inherently 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 Helm Agro US, Inc. or Seller. To the extent consistent with applicable law, all such risks shall be assumed by Buyer and User, and Buyer and User agree to hold Helm and Seller harmless for any claims relating to such factors.

Helm warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. This warranty does not extend to the use of this product contrary to label instructions, or under abnormal conditions or under conditions not reasonably foreseeable to or beyond the control of Seller or Helm, and Buyer and User assume the risk of any such use. **HELM MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE**.

To the extent consistent with applicable law, in no event shall Helm or Seller be liable for any incidental, consequential or special damages resulting from the use or handling of this product. **TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF HELM 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 HELM OR SELLER, THE REPLACEMENT OF THE PRODUCT**.

Helm 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 a duly authorized representative of Helm.

HELM Agro US, Inc.
401 E. Jackson St., Suite 1400
Tampa, FL 33602
Phone: 813.621.8846
Fax: 813.621.0763

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