# VEGETABLE CROPS - COWPEAS (SUCCULENT) (TENNESSEE ONLY) - LESS THAN 1.5% ORGANIC MATTER - FINE

General Information

CALIFORNIA ONLY SPECIFIC RESTRICTIONS ON APPLICATIONS OF HELM SULFENTRAZONE 4F

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

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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F is based on its greater affinity for the PPO IX enzyme in weed species versus crop plants.

Mechanism of Action
Following the application of HELM SULFENTRAZONE 4F to soil, germinating seeds and seedlings take up HELM SULFENTRAZONE 4F from the soil solution. The amount of HELM SULFENTRAZONE 4F 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
HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F. If adequate moisture is not received within 7 to 10 days after the HELM SULFENTRAZONE 4F treatment, a shallow incorporation may be needed to obtain desired weed control. When activating moisture is received after dry conditions, HELM SULFENTRAZONE 4F will provide a reduced level of control of susceptible germinating weeds. Soil applications of HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F. 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.
- HELM SULFENTRAZONE 4F may be applied by air using properly calibrated nozzle types and arrangements that will provide optimum coverage while producing minimal amounts of fine droplets.

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:
- HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F soil application can also significantly increase the amount of HELM SULFENTRAZONE 4F 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.

HELM SULFENTRAZONE 4F should be metered into the irrigation system continuously for the duration of the water application. HELM SULFENTRAZONE 4F

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

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

Follow all HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F onto coated ammonium nitrate or limestone because these materials will not absorb the herbicide. Refer to the crop section of the HELM SULFENTRAZONE 4F 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.

Liquid Fertilizer Solution Application (Ground Application Only): HELM SULFENTRAZONE 4F 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, HELM SULFENTRAZONE 4F will provide satisfactory weed control. Adequate soil coverage is mandatory to achieve acceptable levels of weed control.

HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F in a clean container with clean water using equal volumes of HELM SULFENTRAZONE 4F and clean water. Slowly add the HELM SULFENTRAZONE 4F/water slurry to the spray tank. Rinse the slurry container, adding the rinsate to the spray tank. Better mixing of the HELM SULFENTRAZONE 4F/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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F spray mixture immediately after mixing. DO NOT store the sprayer overnight or for any extended period of time with the HELM SULFENTRAZONE 4F spray mixture remaining in the tank. DO NOT premix HELM SULFENTRAZONE 4F spray solutions in nurse tanks. Follow all HELM

SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F and fertilizer mixture.

MIXING 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 HELM SULFENTRAZONE 4F to the tank. Make sure HELM SULFENTRAZONE 4F is thoroughly mixed before application or before adding another product to the spray tank.

REPLANTING INSTRUCTIONS
If initial planting of labeled crops fails to produce a stand, only labeled crops for HELM SULFENTRAZONE 4F or the tank mix partner; whichever is most restrictive, may be planted. DO NOT retreat field with HELM SULFENTRAZONE 4F or other herbicide containing HELM SULFENTRAZONE 4F. 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.

IMPORTANCE OF SOIL PH
Always determine soilpH 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 HELM SULFENTRAZONE 4F

Drift of dilute spray mixtures containing HELM SULFENTRAZONE 4F 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. HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F.

APPLICATION INSTRUCTIONS

HELM SULFENTRAZONE 4F may be applied to soil in the following use patterns:
- Preplant incorporated treatment
- Surface applied preemergence (prior to weed and/or crop emergence)
- Post-plant 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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F. 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, HELM SULFENTRAZONE 4F can await activating moisture for 10 to 14 days depending on the soil parameters described above.

Once activated, HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F where irrigation is not available and rainfall has not provided activation, particularly for surface applications of HELM SULFENTRAZONE 4F. 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.

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 HELM SULFENTRAZONE 4F. 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.

HELM SULFENTRAZONE 4F Product Use Rates
The following directions for the selection of HELM SULFENTRAZONE 4F application rates are critical to achieve maximum weed control and maximum crop safety. The user must read and follow the specific HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F. This response is tied to the HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F from the soil solution following the application of HELM SULFENTRAZONE 4F to soil. The amount of available HELM SULFENTRAZONE 4F 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 Soil Classification Chart of the label.

Influence of Soil type, organic matter and pH on HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F availability in the soil solution - as soil pH increases, HELM SULFENTRAZONE 4F

availability increases.

Accurate soil pH information will require an accurate analysis of representative soil samples. The total amount of HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F in soil solution. It is important to note that HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F soil application can significantly increase the amount of HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F 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.

Limitations, Restrictions, and Exceptions

VEGETABLE CROPS

Before applying HELM SULFENTRAZONE 4F 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.)

COWPEAS (SUCCULENT) – For Use in Tennessee Only

Application

Apply HELM SULFENTRAZONE 4F as a Preemergence (PRE) application by ground in succulent cowpeas. Refer to the HELM SULFENTRAZONE 4F Product Use Rate Table below for use rates and other specific use information. Broadcast apply the appropriate HELM SULFENTRAZONE 4F 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.

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 HELM SULFENTRAZONE 4F 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.

Precautions
When applying HELM SULFENTRAZONE 4F to coarse textured soils, allow a minimum of 7-14 days from application to planting. Best results are achieved with HELM SULFENTRAZONE 4F 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.

HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F- 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, HELM SULFENTRAZONE 4F 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 HELM SULFENTRAZONE 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on HELM SULFENTRAZONE 4F under specific local conditions.

Restrictions
- DO NOT apply more than 6.0 fluid ounces (0.1875 lb active) per acre of HELM SULFENTRAZONE 4F in a single application.
- DO NOT apply more than 6 fluid ounces (0.1875 lb active) per acre of HELM SULFENTRAZONE 4F per application or per twelve-month period. The twelve month period is considered to begin upon the initial HELM SULFENTRAZONE 4F 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.

Method
Broadcast/Foliar Ground
Rates
field_rates 0

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Restricted Entry Interval

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.

Soils
Fine

Silty Clay Loam
Silty Clay
Clay Loam
Clay
Timings
Preemergence (Crop)