

279-3220

12/20/2004

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DEC 20 2004

Callista Chukwunenyé
FMC. Corporation
1735 Market St.
Philadelphia, PA 19103

Dear Ms. Chukwunenyé:

SUBJECT: Label Amendment
Spartan H4F Herbicide
EPA Registration No. 279-3220
Your Application Dated October 6, 2004

The labeling referred to above, submitted in accordance with registration under the Federal Insecticide, Fungicide, and Rodenticide act, as amended is acceptable with the following provisions:

1. At the beginning of the list of Personal Protective within the Precautionary Statements, add the statements "Some of the materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category A on an EPA chemical-resistance category selection chart." In addition, revise the requirement for "waterproof gloves" to a requirement for "chemical-resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride."
2. Within the list of PPE for early re-entry in the Agricultural Use Requirements box, revise the requirement for "waterproof gloves" to a requirement for "chemical-resistant gloves made of any waterproof material."

A stamped copy is enclosed for your records. Please submit one (1) final printed copy for the above mentioned label, incorporating the above changes, before releasing the product for shipment.

Sincerely yours,

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Joanne I. Miller
Product Manager (23)
Fungicide-Herbicide Branch
Registration Division (7505C)

Enclosure

| | | | | | | | |
|--------------------------------|--|--|--|--|--|--|--|
| 7505C J. Miller 12/17/04 | | | | | | | |
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SPARTAN®

4F Herbicide

For Agricultural or Commercial Use Only

EPA Reg. No. 279-3220

EPA Est. 279-

Active Ingredient: By Wt.

| | |
|--------------------|--------|
| Sulfentrazone* | 39.6% |
| Inert Ingredients: | 60.4% |
| | 100.0% |

* N-[2,4-dichloro-5-[4-(difluoromethyl)-4,5-dihydro-3-methyl-5-oxo-1H-1,2,4-triazol-1-yl]phenyl]methanesulfonamide
 Contains 0.75 pounds of active ingredient per pound formulated.
 U.S. Patent No. 4,818,275

KEEP OUT OF REACH OF CHILDREN

CAUTION

FIRST AID

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.

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.

PRECAUTIONARY STATEMENTS

Hazards to Humans (and Domestic Animals)

Caution

Causes moderate eye irritation. Harmful if inhaled, swallowed, or absorbed through skin. Avoid breathing vapor or spray mist. Avoid contact with skin, eyes or clothing.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear: long-sleeved shirt and long pants, waterproof gloves, and shoes plus socks.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations:
 Users should:
 • Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.



FMC Corporation
 Agricultural Products Group
 Philadelphia PA 19103
 Spartan 4F_3_turf_09-30-2004

Environmental Hazards

This pesticide is toxic to marine/estuarine invertebrates. Do not apply directly to water, 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 in neighboring areas. Do not contaminate water when disposing of equipment washwaters or rinsate.

Groundwater advisory: This chemical is known to leach through soil into groundwater under certain conditions as a result of label use. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

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

Surface water advisory: Sulfentrazone can contaminate surface water through spray drift. Under some conditions, sulfentrazone may also have a high potential for runoff into surface water (primarily via dissolution in runoff water), for several to many months post-application. These 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, and areas over-lying tile drainage systems that drain to surface waters.

Physical/Chemical Hazards

Do not use or store near heat or open flame.

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ACCEPTED
with COMMENTS
In EPA Letter Dated: 16

DEC 20 2004

Under the Federal Insecticide,
 Fungicide, and Rodenticide Act
 as amended, for the pesticide
 registered under EPA Reg. No.

279-3220

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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. These requirements 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.

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, waterproof gloves, and shoes plus socks.

STORAGE AND DISPOSAL

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

Pesticide Storage

Store product in original container only, away from other pesticides, fertilizer, food or feed.

Store in a cool, dry place and avoid excess heat.

In case of spill, avoid contact, isolate area and keep out animals and unprotected persons. Confine spills. Call FMC: (800) 331-3148

To confine spill: If liquid, dike surrounding area or absorb with sand, cat litter or commercial clay. If dry material, cover to prevent dispersal. Place damaged package in a holding container. Identify contents.

Pesticide Disposal

If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional office for guidance.

Container Disposal Triple rinse (or equivalent). Then offer for recycling 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.

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.

Do not apply more than the allowed amount of Spartan 4F per acre per twelve-month period as stated in Table 2. The twelve-month period is considered to begin upon the initial Spartan application.

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

GENERAL INFORMATION

Spartan 4F is a selective soil-applied herbicide for the control or partial control of susceptible broadleaf, grass and sedge weeds. Spartan 4F is formulated as a 4 pound per gallon flowable containing the active ingredient, sulfentrazone. If adequate moisture (1/2" to 1") from rainfall or irrigation is not received within 7 to 10 days after the Spartan treatment, a shallow incorporation may be needed to obtain desired weed control. When activating moisture is received after dry conditions, Spartan will provide a reduced level of control of susceptible germinating weeds. Soil applications of Spartan 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 Spartan.

Proper handling instructions: Spartan 4F may not be mixed or loaded within 50 feet of any wells (including abandoned wells and drainage wells), sinkholes, perennial or intermittent streams and rivers, and natural or impounded lakes and reservoirs. This setback does not apply to properly capped or plugged abandoned wells and does not apply to impervious pad 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. Such a pad shall be designed and maintained to contain any product spills or equipment leaks, container or equipment rinse or washwater, and rainwater that may fall on the pad. Surface water shall not be allowed to either flow over or from the pad, which means the pad must be self-contained. The pad shall be sloped to facilitate material removal. An unroofed pad shall be of sufficient capacity to contain 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, spills or improper disposal of excess pesticide, spray mixtures or rinsates.

APPLICATION INFORMATION

Ground Application

Utilize a boom and nozzle sprayer equipped with the appropriate nozzles, spray tips and screens and adjusted to provide optimum spray distribution and coverage at the appropriate operating pressures. Utilize nozzles that produce minimal amounts of fine spray droplets to avoid spray drift or inadequate foliar and soil coverage. Apply a minimum of 10 gallons of finished spray per acre by ground. Be aware that overlaps and slower ground speeds while starting, stopping or turning while spraying may result in excessive application and subsequent crop response.

Chemigation Application

Spartan 4F may be applied through sprinkler irrigation systems including center pivot, lateral move, end tow, solid set, or hand move irrigation systems. Do not apply this product through any other type of irrigation system. 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 residues on or 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.

It is important to note that irrigation with highly alkaline water (high pH) following a Spartan 4F soil application can also significantly increase the amount of sulfentrazone available in soil solution. Irrigation with water having a pH greater than 7.5 could result in adverse crop response. This response will ultimately depend on initial Spartan 4F application rate, timing, amount and pH of irrigation water, and 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 also 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.

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

When using water from public water systems; DO NOT APPLY SPARTAN 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. Spartan 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.

Aerial 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. Apply a minimum of 5 gallons of finished spray per acre.

Do not apply when wind speed favors drift beyond the area intended for treatment.

SPRAY DRIFT PRECAUTIONS

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.

Spray Drift Management

AVOIDING SPRAY DRIFT AT THE APPLICATION SITE IS THE RESPONSIBILITY OF THE APPLICATOR AND THE GROWER.

The interaction of many equipment and weather related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target 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 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.
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.

Information on Droplet Size

One of the most effective ways to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage for pesticide performance. Applying larger droplets reduces drift potential but will not prevent drift if applications are made improperly or under unfavorable environmental conditions. (See information on Wind, Temperature and Humidity, and Temperature Inversions in subsequent sections).

Controlling Spray Droplet Size

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

Pressure - When higher flow rates are needed, use higher flow rate nozzles rather than increasing spray pressure.

Do not exceed the nozzle manufacturer's recommended pressures. Lower pressure produces larger droplets in many types of nozzles.

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 that produces larger droplets than with other nozzle orientations. Significant nozzle deflection from horizontal will reduce droplet size and increase drift potential.

Nozzle Type - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low drift nozzles for both ground and aerial applications. 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 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height - 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.

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).

Wind - Drift potential is lowest between wind speeds of 3-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given wind speed. Application should be avoided below 3 mph due to variable wind direction and high inversion potential. NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they may potentially affect spray drift potential.

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

Temperature Inversions - Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small-suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the low speed and variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common during conditions of limited cloud cover and little to no wind. They often begin to form as the sun sets and may often continue into the morning. The presence of a temperature inversion may 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 remains in layers and moves laterally in a concentrated cloud (under low speed wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

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 Spartan 4F

Drift of dilute spray mixtures containing Spartan 4F must be prevented. Observation of the preceding environmental conditions, correct application equipment design, calibration and application practices will significantly diminish the risk of off-target spray drift. Spartan 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 Spartan 4F drift mixtures. Depending on concentration of the spray solution and droplets size (effectively determining the dosage of sulfentrazone) 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 Spartan 4F on to unintended crops or plants, irrespective of severity, constitutes misapplication of this product. FMC accepts no responsibility or liability

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for potential crop effects that may result from such misapplication of Spartan 4F.

Table 1

SPARTAN 4F USE RATE CONVERSION CHART

| Spartan Pounds Active | Spartan Herbicide Ounces(Dry) | Spartan 4F Ounces(Liquid) |
|-----------------------|-------------------------------|---------------------------|
| 0.070 | 1.5 | 2.3 |
| 0.094 | 2.0 | 3.0 |
| 0.1175 | 2.5 | 3.5 |
| 0.141 | 3.0 | 4.5 |
| 0.15 | 3.19 | 4.8 |
| 0.1875 | 4.0 | 6.0 |
| 0.20 | 4.24 | 6.4 |
| 0.235 | 5.0 | 7.5 |
| 0.25 | 5.3 | 8.0 |
| 0.28 | 6.0 | 9.0 |
| 0.30 | 6.3 | 9.6 |
| 0.3149 | 6.7 | 10.1 |
| 0.375 | 8.0 | 12.0 |

Table 2

MAXIMUM ALLOWABLE SPARTAN 4F USE PER ACRE PER 12 MONTH PERIOD*

| Crop | Ounces Spartan 4F Per Acre | Pound Active Per Acre |
|------------------------|----------------------------|-----------------------|
| Row Crops | | |
| Corn | 12.0 | 0.375 |
| Fallow | 8.0 | 0.25 |
| Peanuts | 9.6 | 0.30 |
| Potatoes | 8.0 | 0.25 |
| Soybeans | 12.0 | 0.375 |
| Sugarcane | 12.0 | 0.375 |
| Sunflowers | 8.0 | 0.25 |
| Tobacco | 12.0 | 0.375 |
| Vegetable Crops | | |
| Asparagus | 12.0 | 0.375 |
| Cabbage | 12.0 | 0.375 |
| Dry Beans and Peas | 8.0 | 0.25 |
| Horseradish | 8.0 | 0.25 |
| Lima Beans (Succulent) | 6.0 | 0.1875 |
| Oil Crops | | |
| Mint | 12.0 | 0.375 |

*The total allowed usage per twelve-month period includes all applications made to the field per twelve-month interval. This includes fallow treatments, burndown treatments, planting time and all in-season treatments. The twelve-month period is considered to begin upon the initial Spartan application.

GENERAL APPLICATION INSTRUCTIONS

Spartan 4F may be applied to soil as a preplant incorporated treatment or as a pre-emergence (to weed and crop) surface application. Additional application methods include post-plant treatments, over-the-top and layby, in various crops. Application methods are defined in the following Crop Use Directions sections.

Preplant incorporated treatments require a uniform surface application followed by incorporation to a depth no greater than 2 inches. Care must be taken not to create overlaps in treated zones due to soil movement which will result in excessive Spartan 4F rates that could result in adverse crop response. Additional care must be exercised to prevent deep incorporation of Spartan 4F which may result in poor weed control performance on shallow germinating weeds.

All soil applications and the residual activity of post-plant applications of Spartan 4F require adequate moisture for herbicidal activation. The ultimate 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 tillth. In crop situations dependent on rainfall, Spartan 4F can await activating moisture for extended periods (10 to 14 days or longer) depending on the soil parameters described above. Once activated, Spartan 4F will provide activity on existing weeds. The level of activity will depend on the weed species and their size at time of activation. Where irrigation is not

available and rainfall has not provided activation, particularly for surface applications of Spartan 4F, a shallow incorporation is recommended for destruction of any germinating weeds and to incorporate Spartan 4F. Herbicide incorporation will initiate the process of activation with existing soil moisture. In circumstances where prolonged periods without rainfall or irrigation are not possible, alternative or additional weed management practices (cultivation or post-applied herbicides) may be required.

Extreme care must be exercised and the Crop Specific Use Directions followed exactly in crops allowing post plant applications of Spartan 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 as well.

GENERAL SPARTAN 4F PRODUCT USE RATES

The following directions for the selection of Spartan 4F application rates are critical to achieve maximum performance and to insure maximum crop safety. The user is required to read and follow the specific Spartan use directions and restrictions for each crop as defined in subsequent sections of this label. The user is cautioned that some crops respond differentially to Spartan 4F. This response is governed by the Spartan 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.

Mode of Action

Sulfentrazone, the active ingredient in Spartan 4F, is a potent inhibitor of the enzyme Protoporphyrinogen Oxidase IX (PPO IX) required 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 leakage. The ultimate manifestation of the process is cellular death leading to plant death. The selective herbicidal activity of sulfentrazone is based on its greater affinity for the PPO IX enzyme in weed species versus crop plants.

Mechanism of Action

Following the application of Spartan 4F to soil, germinating seeds and seedlings take up sulfentrazone from the soil solution. The amount of sulfentrazone in soil solution, and available for weed uptake, is determined primarily by soil type, organic matter and soil pH. Sulfentrazone adsorbs to the 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, Table 3.

Table 3

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 Spartan Use Rates and Crop Response

Soil organic matter content can vary 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 affect on sulfentrazone availability in the soil solution. As soil pH increases, sulfentrazone availability increases. Soil pH also requires an accurate analysis of representative soil samples.

The total amount of sulfentrazone available in solution, in any given soil, is determined by the 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 sulfentrazone in soil solution. It is important to note that Spartan 4F can await activating moisture. However, diminished weed control may result due to the successive increase in weed growth versus timing of activation.

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It is important to note that irrigation with highly alkaline water (high pH) following a Spartan 4F soil application can also significantly increase the amount of sulfentrazone available in the soil solution. Irrigation with water having a pH greater than 7.5 could result in adverse crop response. This response will ultimately depend on initial Spartan 4F application rate, timing, amount and pH of irrigation water and sensitivity of the crop and it's 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 Spartan 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.

ROTATIONAL CROP GUIDELINES

The following Table 4 shows the minimum interval in months from the time of the last Spartan 4F application until Spartan 4F treated soil can be replanted to the crops listed. When Spartan 4F is tank mixed with another herbicide, refer to the partner label for recropping instructions, following the directions that are most restrictive.

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 Spartan 4F application due to potential crop injury. A representative bioassay of the field shall be completed with the rotational crop to determine sensitivity.

Table 4
ROTATIONAL CROP GUIDELINES**

| Crop | Interval (Months) |
|--|-------------------|
| Alfalfa | 12 |
| Barley | 4 |
| Cabbage | Anytime |
| Canola | 24 |
| Cereal Grains (Buckwheat, Oats, Pearl Millet, Proso Millet, Teosinte, Wild rice) | 12 |
| Corn, Field | 10 |
| Corn, Pop | 18 |
| Corn, Sweet | 18 |
| Cotton | 18 |
| Dry Shell Pea and Beans | Anytime |
| Horseradish | Anytime |
| Limas | Anytime |
| Mint | Anytime |
| Peanuts | Anytime |
| Potatoes | Anytime |
| Rice | 10 |
| Rye | 4 |
| Sorghum | 10* |
| Soybeans | Anytime |
| Sunflowers | Anytime |
| Sugar Beets | 36 |
| Sweet Potatoes | 12 |
| Triticale | 4 |
| Tobacco | Anytime |
| Wheat | 4 |

*Sorghum – 18-month rotation for rates above 8.0 oz/acre
**For all other crops not listed, the rotation interval is a minimum of 12 months.

REPLANTING INSTRUCTIONS

If initial planting of labeled crops fails to produce a stand, only labeled crops for Spartan 4F or the tank mix partner, whichever is most restrictive, may be planted. Do not retreat field with Spartan 4F or Spartan 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.

BAND TREATMENT APPLICATIONS

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

$$\frac{\text{Band Width (Inches)}}{\text{Row Width (Inches)}} \times \text{Broadcast Rate (Per Acre)} = \text{Band rate per acre}$$

$$\frac{\text{Band Width (Inches)}}{\text{Row Width (Inches)}} \times \text{Broadcast Volume (Per Acre)} = \text{Band volume per acre}$$

SPRAY TANK PREPARATION

It is important that spray equipment is clean and free of existing pesticide deposits before preparing Spartan spray mixtures. Follow the spray tank clean out procedures specified on the label of the product or products previously applied.

MIXING INSTRUCTIONS

Spartan 4F may be tank mixed with other herbicides for the control of additional weed species. Mixtures with some other pesticides have not been tested. Conduct appropriate compatibility tests prior to tank mixing with other pesticides. Follow all precautions and restrictions on the tank mix partner label.

For best results fill spray tank with one half of the volume of clean water needed for the field to be treated. Start agitation system. Prepare a slurry of Spartan 4F in a clean container using clean water. Slowly add the Spartan/water slurry to the spray tank. Carefully rinse the slurry container, adding the rinsate to the spray tank. Complete filling the spray tank to the desired level. Continuous spray tank agitation is required at all times to maintain a uniform spray solution. Make sure Spartan is thoroughly mixed before application or before adding another product to the spray tank.

Use the Spartan spray mixture immediately after mixing. Do not store the sprayer overnight or for any extended period of time with the Spartan spray mixture remaining in the tank. Premixing Spartan spray solutions in nurse tanks is not recommended.

If Spartan is tank mixed with other herbicides, all additional directions, restrictions and precautions for the tank mixture herbicides must be followed.

SPRAYER EQUIPMENT CLEAN OUT

After spraying Spartan and before using sprayer equipment for any other applications, the sprayer must be thoroughly cleaned to avoid potential crop affects using the following procedure.

1. Drain sprayer tank, hoses, and spray boom. Use a high-pressure detergent wash to remove physical sediment and residues from the inside of the sprayer tank and thoroughly rinse. Thoroughly flush sprayer hoses, booms and nozzles with clean water.
2. Fill the tank 1/2 full with clean water, and add appropriate detergent or ammonia (follow manufacturer's directions for use). Fill the tank to sufficient capacity to operate the sprayer for 15 minutes to flush hoses, booms, and nozzles.
3. Drain the sprayer system. Rinse the tank with clean water and flush through the hoses, boom, and nozzles. Remove and clean spray tips and all strainers and screens separately.
4. Properly dispose of all cleaning solution and rinsate in accordance with Federal, State and local regulations and guidelines.
5. Do not drain or flush equipment on or near desirable trees or plants. Do not contaminate any body of water including irrigation water that may be used on other crops.

APPLICATION WITH DRY FERTILIZERS

Spartan 4F may be applied impregnated on dry fertilizers. When applied as directed with adequate soil coverage, Spartan dry bulk fertilizer mixtures will provide satisfactory weed control, but adequate soil coverage is essential.

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Follow all Spartan label directions regarding product use rates per acre, registered crops, incorporation, special instructions and precautions. Apply Spartan/dry fertilizer mixtures with ground equipment only.

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 Spartan/dry fertilizer mixture.

A minimum of 200 pounds of dry bulk fertilizer impregnated with the recommended amount of Spartan must be applied per acre to achieve adequate soil coverage for satisfactory weed control.

DO NOT impregnate Spartan onto coated ammonium nitrate or limestone because these materials will not absorb the herbicide.

Refer to the appropriate crop section of the Spartan label to determine the rate of Spartan to be applied per acre. Use the following table to determine the amount of Spartan to be impregnated on a ton (2000 pounds) of dry bulk fertilizer based on the rate of fertilizer that will be applied per acre.

For those rates not listed in the following table, calculate the amount of Spartan to be impregnated on a ton of dry bulk fertilizer using the following formula:

$$\frac{2000}{\text{pounds dry fertilizer per acre}} \times \text{Spartan use rate in ounces} = \text{Ounces of Spartan to be applied per ton of fertilizer}$$

Table 5
RATE CHART FOR IMPREGNATION OF DRY BULK FERTILIZERS WITH SPARTAN 4F

(Ounces of Spartan 4F per ton of Fertilizer)

| Fertilizer Rate (lb/acre) | Spartan 4F Rate Per Acre | | |
|---------------------------|--------------------------|-----------|-----------|
| | 8.0 oz/a | 10.1 oz/a | 12.0 oz/a |
| 200 | 53 | 67 | 80 |
| 250 | 42.4 | 53.6 | 64 |
| 300 | 35.3 | 44.7 | 53.3 |
| 350 | 30.3 | 38.3 | 45.7 |
| 400 | 26.5 | 33.5 | 40 |
| 450 | 23.6 | 29.8 | 35.6 |

IMPREGNATION DIRECTIONS

To impregnate Spartan 4F on dry bulk fertilizer, use a closed rotary-drum mixer or other commonly used dry bulk fertilizer blender equipped with suitable spray equipment.

Prepare a slurry of Spartan 4F in a clean container using clear water. Slowly add the Spartan/water slurry to the impregnation spray tank and finish filling as needed with clear water. Spray nozzles must be placed to provide uniform coverage of Spartan onto the fertilizer during mixing.

Refer to the SPRAYER EQUIPMENT CLEAN-OUT section for directions for cleaning impregnation equipment.

Apply the Spartan 4F dry bulk fertilizer with an accurately calibrated dry fertilizer spreader. The Spartan 4F dry bulk fertilizer mixture must be spread uniformly on the soil surface. Uneven spreading leaving untreated areas can cause poor weed control or overlapping areas with potential increased Spartan 4F use rates could result in possible crop response.

APPLICATION WITH LIQUID FERTILIZERS

Spartan 4F may be applied using liquid fertilizer solutions as the carrier. The fertilizer solutions may either be concentrate formulations as blended or diluted with water. When applied as directed with adequate soil coverage, Spartan 4F applied with liquid fertilizer mixtures will provide satisfactory weed control. However, adequate soil coverage is essential to achieve acceptable levels of weed control.

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. The use of compatibility agents may be beneficial to achieve and maintain a homogenous solution.

Mixing Instructions

Fill the clean spray tank to one half of the total volume with the fertilizer solution. Start the spray tank agitation system. Prepare a slurry of Spartan 4F in a clean container with clean water using equal volumes of Spartan 4F and clean water. Slowly add the Spartan/water slurry to the

spray tank. Carefully rinse the slurry container, adding the rinsate to the spray tank. Better mixing of the Spartan 4F/water slurry may be achieved if the slurry is added using induction systems on the sprayer fill plumbing system.

Complete filling the spray tank to the desired level. Sufficient and continuous 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. Some systems may require separate pumps to simultaneously supply the spray system and the spray tank agitation system. Insure the Spartan 4F slurry is thoroughly mixed before application.

For tank mixtures with other herbicide(s), a compatibility test must be conducted 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 Spartan 4F spray mixture immediately after mixing. Do not store the sprayer overnight or for any extended period of time with the Spartan 4F spray mixture remaining in the tank.

Premixing Spartan 4F spray solutions in nurse tanks is not recommended.

Follow all Spartan 4F label directions regarding product use rates per acre, registered crops, application instructions, incorporation directions, special instructions and all precautions.

All individual state regulations 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 Spartan 4F and fertilizer mixture.

WEEDS CONTROLLED

The overall spectrum of weed performance of Spartan 4F is provided in Table 6. This table reflects Spartan 4F activity based on extensive field performance testing in numerous crops. It is categorized into two levels of economic herbicide performance, Control (>85%) and Partial Control (71 to 84%). When applied in accordance with the previous General Application Instructions and the Crop Specific Use directions below, Spartan 4F activity will perform as described in Table 6. Specific key economic weeds controlled by Spartan 4F are presented in each Crop Specific Use recommendation as well. It is important to note that certain exceptions to the overall weed performance occur under various circumstances. These exceptions are noted, by weed species, in the Crop Specific Use directions when they are recognized to occur. In such cases, additional or alternative weed management may be required for these weed species. FMC accepts no responsibility or liability for potential reduction or failure of weed control performance resulting from the failure to observe this weed spectrum and the noted exceptions in the Crop Specific Use directions.

CONTROL Weed control greater than 85%
PARTIAL CONTROL Weed control from 71% to 84%

Table 6

Weed Spectrum of Spartan 4F BROADLEAVES

| CONTROL (85%+) | PARTIAL CONTROL (71% TO 84%) |
|--------------------------|--|
| Amaranth | Beggarticks |
| Palmer | Biennial Wormwood |
| Spiny | Blackjack, common |
| Spleen | Buttercup, Smallflower |
| Livid | Buttonweed, broadleaf |
| Anoda, spurred | Bindweed, field |
| Beggarweed, Florida | Campion, white |
| Buckwheat, wild | Callilly, Brazil |
| Carpetweed | Capote, tiende |
| Catchweed Bedstraw | Cocklebur, common |
| Chickweed, common | Dayflower, common |
| Copperleaf | Fennel, dog |
| Hopornbeam | Goosefoot |
| Virginia | Lettuce, prickly |
| Croton, tropic | Mallow, Venice |
| Daisy, American | Mexicanweed |
| Devilsclaw | Morningglory, |
| Dock, curly | Blue |
| Eclipta | Pitted |
| Flixweed | Mustard, wild |
| Golden Crownbeard | Nightshade, |
| Gaiinsoga, hairy | American black |

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- | | |
|-------------------------------------|----------------------|
| Groundcherry, clammy (seedling) | Eastern black |
| Groundcherry, cutleaf | Oxtongue, bristly |
| Jimsonweed | Radish, wild |
| Kochia (ALS and Triazine Resistant) | Pigweed, tumble |
| Ladysthumb | Puncturevine, common |
| Lambsquarters, common | Spurge, cypress |
| Lettuce, miners | Tansymustard |
| Mayweed Chamomile | Texasweed |
| Mallow, common | Toadflax, yellow |
| Milkweed, honeyvine | Vervain, prostrate |
| Mustard, tumble | Wild buckwheat |
| Morningglory | |
| Entireleaf | |
| Ivyleaf | |
| Palmleaf | |
| Purple | |
| Red | |
| Scarlet | |
| Smallflower | |
| Tall | |
| Nightshade | |
| Black | |
| Hairy | |
| Silverleaf | |
| Pigweed: | |
| Redroot | |
| Smooth | |
| Plantain | |
| Blackseed | |
| Narrow-leaved | |
| Poorjoe | |
| Porophyllum | |
| Poinsettia, wild | |
| Purslane, common | |
| Pusley, Florida | |
| Redstem Filaree | |
| Redweed | |
| Rockpurslane, redmaids | |
| Senna, coffee | |
| Shepardspurse | |
| Sida | |
| Prickly | |
| Southern | |
| Smartweed | |
| Pennsylvania | |
| Pale | |
| Smellmellon | |
| Speedwell, American | |
| Spurge, spotted | |
| Spurge, prostrate | |
| Starbur, bristly | |
| Tassleflower, red | |
| Thistle, Russian | |
| Velvetleaf | |
| Waterhemp | |
| Common | |
| Tall | |
| Waterprimrose, winged | |

GRASSES

- | | |
|--------------------------|--|
| CONTROL (85%+) | PARTIAL CONTROL (71% TO 84%) |
| Crabgrass | Alexandergrass |
| Large | Barnyardgrass, common |
| Smooth | Bluegrass, annual |
| Small | Crowfoot |
| Southern | Cheat |
| Cupgrass, wooly | Foxtail |
| Goosegrass | Bristly |
| Signalgrass, broadleaf | Giant |
| Orchardgrass | Green |
| Panicum, fall | Yellow |
| Stinkgrass | Knotroot |
| Witchgrass | Robust |
| | Panicum, Texas |
| | Sandbur, field |
| | Sprangletop, red |

SEDGES

- | | |
|--------------------------|--|
| CONTROL (85%+) | PARTIAL CONTROL (71% TO 84%) |
| Nutsedge, yellow | |
| Nutsedge, purple | |
| Sedge, annual | |
| Cyperus, hedgehop | |

Tank mixing with other grass soil applied herbicides, postemergence grass herbicides or mechanical cultivation will be required for grass management.

ROW CROPS

CORN (Field Corn, Seed Corn, Popcorn)

Table 7

| Spartan 4F Use Rate Table (Corn) | | | |
|---|----------------------------|------------|-------------|
| Fall, Spring Early Preplant, Preemergence, and Preplant Incorporated Applications | | | |
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0 | 3.0 - 4.5 | 3.0 - 4.5 | 3.75 - 5.25 |
| 1.0-3.0 | 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 |

Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Preplant (Fall Applications)

Spartan 4F may be applied in the fall as a preplant treatment prior to corn planting the following spring. Spartan 4F can be used alone or in a tank mixture with other herbicides to control susceptible broadleaves, sedges and grasses in corn. Apply Spartan 4F on conventional tillage or conservation tillage (reduced tillage or no-tillage) cropping systems using rates recommended in the Table 7. Spartan 4F should be applied to the 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 operation can destroy the herbicide barrier allowing weed escapes to occur. Do not apply to frozen soils or existing snow cover to prevent Spartan 4F runoff from rain or snowmelt that may occur following application. Spartan 4F may be tankmixed with other burndown herbicides to control emerged weeds in the fall or residual soil herbicides that are labeled for fall use on corn. Select the correct Spartan 4F corn use rate from the Table 7 for your soil type and organic matter. Due to the extended period of time between the fall application and corn planting, the use rate of Spartan 4F should be the mid to high rate within the rate range for the appropriate soil type and organic matter.

Early Preplant and Preemergence (Spring Applications)

Spartan 4F may be applied preplant on the soil surface in the spring to control weeds in conventional and conservation tillage systems. Spartan 4F can be applied from 45 days prior to planting until 3 days after planting as a preemergence broadcast or banded soil application if corn seedlings have not broken the soil surface and if the seed furrow is completely closed. For preemergence applications 14 to 45 days prior to planting, use the mid to high rate in the appropriate rate range for the soil and organic matter type listed in Table 7. Spartan 4F can be tank mixed with other herbicides labeled for use in corn. To control insect pests such as cutworm or armyworm that may be present, Spartan 4F may be tankmixed with insecticides including Mustang Max or Capture 2EC. If dry conditions persist following preemergence application of Spartan 4F, a shallow incorporation may be needed to activate the herbicide. If weeds are emerged at the time of Spartan 4F application, use a burndown herbicide in conjunction with Spartan 4F as needed. When planting into soil treated preplant with Spartan 4F, minimize soil disturbance to maintain the herbicide barrier on the soil surface to achieve maximum weed control. 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

Spartan 4F may be applied as a Preplant Incorporated treatment in the spring prior to planting in reduced and conventional tillage corn. Spartan 4F should be shallowly incorporated or mixed thoroughly into the soil to a maximum depth of 2 inches using a correctly adjusted implement such as a field cultivator, field finisher or disk harrow. Incorporating Spartan 4F deeper than 2 inches may result in inconsistent weed control. Use the appropriate rate from Table 7 for the soil texture, organic matter, and pH level of the soil. Spartan 4F can be tankmixed with other soil-applied herbicides and insecticides labeled for preplant

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incorporation in corn. 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.

Spartan 4F may be applied more than once to the same crop in split or sequential applications to provide season-long control of tough to control existing or late emerging weeds.

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Do not apply more than 12.0 oz (0.375 pound active) per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application.

FALLOW OR POST HARVEST BURNDOWN

Spartan 4F may be applied in the fall following crop harvest or in existing fallow fields: asparagus, cabbage, corn, dry shell peas and beans, horseradish, limas, mint, peanuts, potatoes, soybeans, sugarcane, sunflowers and tobacco.

Table 8

| Spartan 4F Use Rate Table (Fallow or Post Harvest Burndown) Fall and Spring Fallow Applications | | | |
|--|----------------------------|------------|-------------|
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0 | 3.0 - 3.75 | 3.0 - 4.5 | 3.75 - 5.25 |
| 1.0-3.0 | 3.75 - 5.25 | 3.75 - 6.0 | 4.5 - 6.75 |
| >3 | 4.5 - 6.0 | 4.5 - 8.0 | 5.25 - 8.0 |
| Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range. | | | |

Fall Application (MN, ND, SD, MT, CO, NE, WY, ID, WA, OR, WI, MI)

Spartan 4F may be applied in the fall following crop harvest or in existing fallow fields to control or suppress weeds the following season. The Spartan 4F Rotational Crop Guidelines in Table 4 must be followed if crops are planted the next season. Spartan 4F should be applied to the harvested crop stubble or soil surface without incorporation. Moisture in the form of rain or snow will move and activate the product. Do not mechanically incorporate in the fall or spring after application because this activity can destroy the herbicide barrier and weed escapes can occur. Do not apply to frozen soils to prevent Spartan 4F runoff from rain or snow that may occur following application. Spartan 4F may be tankmixed with herbicides to control emerged weeds. Sequential applications may be needed depending on weed size. In situations where weed size will interfere with Spartan 4F reaching the ground surface, a separate burndown application prior to the application of Spartan 4F will be required. Use full, recommended rates of burndown herbicides in combination with Spartan 4F, or sequential applications as needed. Higher aerial spray volumes are required when there is a dense weed population or canopy.

Spartan 4F can be mixed with other herbicides. 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.

Spring Preemergence Application

Spartan 4F may be applied as a fallow treatment early in the spring provided the application is made prior to weed emergence, and adequate

moisture is available to activate the Spartan 4F. Follow the same use rate recommendations and application guidelines listed under the Fall Application section above.

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

- | | |
|-------------------------------------|-----------------------|
| Eastern Black Nightshade | Lambsquarter, Common |
| Redroot Pigweed | Morningglory, Ivyleaf |
| Redstem Filaree | Morningglory, Tall |
| Kochia (ALS and Triazine Resistant) | Smooth Pigweed |
| Tall Waterhemp | Common Waterhemp |
| Russian Thistle | |

When applied according to directions, Spartan 4F will provide partial control of:

- | | |
|-------------------|----------------|
| Biennial wormwood | Wild Buckwheat |
|-------------------|----------------|

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Use Restrictions

Do not apply more than 8.0 oz (0.25 lb active) per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application.

PEANUTS

Southeastern US (AL, GA, NC, SC, VA, MS) Only

Apply Spartan 4F alone or in combination with other registered herbicides for the control of key grass and broadleaf weeds in peanut production. Refer to the information below for specific use directions. Spartan 4F is registered for use on peanuts only in the following states: AL, GA, NC, SC, VA and MS.

Application Instructions

Spartan 4F may be preplant incorporated (to a depth no greater than 2 inches) up to 14 days prior to planting. Alternatively, Spartan 4F may be applied to the soil surface at planting, or within 12 hours after planting. Incorporation of Spartan 4F deeper than 2 inches can result in adverse crop response and / or inconsistent weed control. Do not use Spartan 4F for 'at-crack' type applications or apply to exposed peanut tissue. Such use can result in significant adverse crop response. For optimum performance, a combination of Spartan 4F plus a grass herbicide labeled for peanuts is recommended. Under conditions of exceptionally high weed populations or when weeds not controlled by Spartan 4F are anticipated, the use of suitable post-emergent peanut herbicides is recommended. Broadcast apply the correct Spartan 4F use rate from Table 9 below, in a minimum of 10 gallons of water per acre of finished spray. Banded Spartan 4F application rates must be adjusted in proportion to the broadcast rate.

Table 9

Spartan 4F Use Rates and Weeds Controlled in Coarse Soils¹

| 4.8 oz | 6.4 oz. | 8.0 oz. |
|-----------------------|-------------------------------|---------------------|
| Amaranth, spleen | Amaranth | Anoda, Spurred |
| Copperleaf, | Palmer | Beggarweed, Florida |
| Hophornbeam | Eclipta | Cocklebur, Common |
| Croton, Tropic | Morningglories, | Sedges, |
| Crownbeard, Golden | Pitted | Yellow |
| Devilsclaw | Smallflower | Purple ³ |
| Jimsonweed | Poinsettia, wild ² | Purslane, Common |
| Lambsquarters, Common | Redweed | Sida, Prickly |
| Morningglories | Senna, Coffee | Starbur, Bristly |
| Entireleaf | Smartweed, | Crabgrass, |
| | Pennsylvania | |
| Ivyleaf | Crabgrass | Large |
| Red (Scarlet) | Large | Small |
| Palmleaf | Small | Southern |
| Purple | Southern | Anoda, Spurred |

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| | | |
|-------------------|-----------------------------------|--|
| Tall | Goosegrass | All species listed at 4.8 and 6.4 oz/a |
| Pigweeds | Signalgrass, Broadleaf | |
| Redroot | All species listed at 4.8 oz/acre | |
| Smooth | | |
| Spurges | | |
| Prostrate | | |
| Spotted | | |
| Waterhemp, Common | | |

¹Use rates are Spartan 4F fluid ounces per acre. Specified weeds are controlled in coarse (sand and loamy sand) soils. Medium and fine soils (sandy loam, clay loam, clay) or soils with organic matter greater than 1.0% should use the next higher rate in Table 9 above. The next higher rate for 8.0 oz. (0.25 lb ai) should not exceed 9.6 oz. (0.3 lb ai) per acre.

² Controls initial and several continuing flushes (germinations) of wild poinsettia.
³ Purple nutsedge activity is based on preplant incorporated applications of Spartan 4F. Pre-emergence surface applications may provide control (>85%) under certain circumstances. Otherwise, purple nutsedge will be partially controlled (71 to 84%).

In soils with pH>7, use the next lower Spartan 4F application rate. Irrigation with alkaline (pH 8 to 9) water can result in adverse crop response. The extent of crop response is dependent on Spartan 4F application rate, soil type (including %OM and pH), timing (after Spartan application relative to crop emergence), amount and pH of irrigation water. Do not irrigate with water greater than pH 9.

After peanuts are established (4" to 6" across in size), the alkalinity of irrigation water has minimal impact on crop growth.

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Do not apply more than 9.6 oz/a (0.3 lb ai) of Spartan 4F per acre per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application.
 Do not feed treated peanut forage or peanut hay to livestock.

POTATOES

Table 10

| Spartan 4F Use Rate Table (Potatoes) | | | |
|--------------------------------------|----------------------------|-------------|-------------|
| Preemergence Application | | | |
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0 | 3.0 - 4.5 | 3.0 - 4.5 | 3.75 - 5.25 |
| 1.0-3.0 | 3.0 - 4.5 | 3.75 - 6.0 | 4.5 - 6.0 |
| >3 | 4.5 - 6.0 | 5.25 - 6.75 | 6.0 - 8.0 |

*Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories
 Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Ground and Aerial Applications

Apply Spartan 4F by aerial application as a preemergence treatment following planting and after dragoff, but prior to potato emergence. Optimum performance can be achieved if Spartan 4F is applied to the soil surface and either rainfall or overhead irrigation is used to activate the product. If no moisture is received within 7 days following application in areas without irrigation, a shallow incorporation (less than 2 inches) may be needed prior to weed and potato emergence to activate the product. Select the appropriate use rate based on soil texture and organic matter as shown in Table 10 above. For control of emerged weeds at the time of the Spartan application, an appropriate burndown

herbicide and adjuvants labeled for potatoes may be tankmixed with Spartan to control these weeds. Do not apply Spartan 4F if the potatoes have emerged from the soil as undesirable crop response may occur. Spartan 4F may be tankmixed with other soil-applied herbicides labeled for use in potatoes to improve weed management and increase weed control spectrum. Apply Spartan 4F in a minimum of 10 gallons of spray by ground application and 5 gallons of spray

Chemigation Applications

Spartan 4F may be applied to potatoes through sprinkler irrigation systems including center pivot, lateral move, end tow, solid set or hand move irrigation systems. Apply Spartan 4F prior to potato emergence using sufficient water (0.25 to 0.5 inch per acre) to provide thorough soil

surface coverage, but to avoid runoff of irrigation water. Spartan 4F may be applied with other products labeled for chemigation use in potatoes.

It is important to note that irrigation with highly alkaline water (high pH) following a Spartan 4F soil application may significantly increase the amount of sulfentrazone available in soil solution. Irrigation with water having a pH greater than 7.5 could result in adverse crop response. This response will ultimately depend on initial Spartan 4F application rate, application timing, amount and pH of irrigation water; the sensitivity of the crop and the crop growth stage when irrigated. The risk of adverse crop response will lessen with advances in the crop growth stage.

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

- | | |
|--------------------------------------|-----------------------|
| Amaranth, Palmer | Lambsquarter, Common |
| Redroot Pigweed | Morningglory, Ivyleaf |
| Smooth Pigweed | Morningglory, Tall |
| Redstem Filaree | Waterhemp, Tall |
| Waterhemp, Common | Thistle, Russian |
| Nightshade, Eastern Black | |
| Kochia, (ALS and Triazine Resistant) | |
| Pigweed, smooth | |

When applied according to directions, Spartan 4F will provide partial control of:

- | | |
|-------------------|------------------|
| Velvetleaf | Hairy Nightshade |
| Barnyardgrass | Wild buckwheat |
| Biennial wormwood | Venice Mallow |
| Yellow Nutsedge | Purple Nutsedge |

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

Potato varieties may vary in their response to herbicide applications. When using Spartan 4F on an untested variety, always determine the crop tolerance before planting. Some potato varieties, including Sangre, Shepody and Snowden, have shown sensitivity to Spartan 4F. Caution should be used when planting these varieties on marginal coarse soils.

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Do not apply to soils classified as sand with less than 1% organic matter
 Do not apply Spartan 4F after potato emergence from the soil as undesirable crop response may occur.
 Do not apply more than 8.0 oz (0.25 pound active) per acre per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application.

SOYBEANS

Table 11

| Spartan 4F Use Rate Table (Soybeans) | | | |
|---|----------------------------|-------------|------|
| Fall, Spring Early Preplant, Preemergence, and Preplant Incorporated Applications | | | |
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0 | 4.5 - 6.0 | 6.0 - 8.0 | 8.0 |
| 1.0-3 | 6.0 - 8.0 | 8.0 - 10.1 | 10.1 |
| >3 | 8.0 - 10.1 | 10.1 - 12.0 | 12.0 |

Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Ground and Aerial Applications

Apply Spartan 4F in conventional tillage, conservation tillage, reduced tillage or no-tillage cropping systems using rates recommended in the Spartan 4F Use Rate Table 11. Spartan 4F may be with ground or aerial sprayers calibrated to deliver a minimum of 10 gallons of finished spray by ground application and 5 gallons of finished spray by air. 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.

Preplant Incorporated and Preemergence Applications

Spartan 4F can be applied prior to planting or up to 3 days after planting. When applications after planting are delayed greater than 3 days, injury may occur if seeds are germinating. Spartan 4F may be applied preemergence or preplant incorporated. For preplant incorporated applications, incorporation must be uniform and no deeper than 2 inches. Improper soil incorporation may result in erratic weed control and/or crop injury. Spartan 4F applied near or after crop emergence may cause severe injury to the crop. Spartan 4F can be applied alone or in combination with other labeled soybean herbicides. Spartan 4F 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 Spartan 4F in no-till or minimum till cropping systems, tank mix with an appropriate burndown herbicide for improved control of existing weeds.

Fall Applications

Spartan 4F may be applied as a fall treatment to the stubble of harvested crops for the burndown of existing vegetation and preemergence control of labeled weeds the following spring in no-till and conservation tillage production systems. Fall applications of Spartan 4F must be made in weed control programs that include, as needed, spring applications of preplant, preemergence or postemergence herbicides for the following crop season. Spartan 4F can be applied to the stubble of a harvested crop 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 after September 30 in those areas North of Interstate 90 and after October 15 in those areas North of Interstate 70. Do not apply Spartan 4F as a fall treatment South of Interstate 70. Applications to ridge till production systems must be made after the formation of ridges.

If weeds are emerged at the time of application, utilize a tank mixture with a suitable burndown herbicide at labeled rates. Fall applied burndown treatments should be made with a minimum of 20 gallons per acre to achieve adequate coverage of the weeds being treated. When making burndown applications to emerged weeds, the addition of adjuvants such as COC or MSO to the spray mixture can be used to enhance the burndown activity of the application.

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

| | |
|--------------------------------------|------------------------|
| Waterhemp, spp | Nightshade |
| Amaranth, palmer | Lambsquarters, Common |
| Pigweed, spp | Morningglory, spp. |
| Sida, prickly | Wild Buckwheat |
| Velvetleaf | Russian Thistle |
| Kochia, (ALS and Triazine Resistant) | Hophornbeam copperleaf |
| Venice Mallow | Cocklebur |
| Biennial wormwood | |

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

When applying this product with other registered herbicides, refer to specific label information on precautions, instructions, limitations, application methods and timings, and weeds controlled.

Spartan 4F is especially effective against a wide range of economic broadleaf and grass weeds. The same processes that sulfentrazone affects in these weeds can, under certain conditions, be affected in soybeans. These conditions include high pH (7.5 and above), cool weather, prolonged and excessive moisture, seedling diseases, and any other condition, including poor agronomic practices, that are unfavorable to vigorous crop growth. Such effects in soybeans are often observed 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 Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Do not apply more than 12.0 ounces (0.375 lbs active) per acre of Spartan 4F per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application. Do not apply Spartan to frozen soil.

SUGARCANE

Table 12

| Spartan 4F Use Rate Table (Sugarcane) | | | |
|---------------------------------------|----------------------------|-------------|------|
| Planting Time and Lay-by Applications | | | |
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0 | 4.5 - 6.0 | 6.0 - 8.0 | 8.0 |
| 1.0-3 | 6.0 - 8.3 | 8.0 - 10.1 | 10.1 |
| >3 | 8.0 - 10.1 | 10.1 - 12.0 | 12.0 |

Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Apply Spartan 4F as a broadcast or banded preemerge soil applied treatment for the control of broadleaf weeds, grasses and sedges in sugarcane. Refer to the Spartan 4F Product Use Rate Section and Table 12 for specific use information.

Planting Time Applications

Apply Spartan 4F preemerge to newly planted or ratoon sugarcane. Use the higher rate on clay soils and / or soils with organic matter content higher than 2 percent. Apply either by air in a minimum of 5 gallons of spray per acre or by ground equipment in a minimum of 15 gallons of spray per acre. Spartan 4F may be applied with other herbicides registered for use in sugarcane.

Aerial Applications

Spartan 4F may be applied by air in a minimum of 5 gallons of finished spray per acre. Spartan 4F may be applied with other herbicides or insecticides registered for use in sugarcane.

Lay-by Applications

Apply Spartan 4F as a directed spray to sugarcane at lay-by timing. Use the higher rate 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. Spartan 4F may be applied with other herbicides registered for use in sugarcane.

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TOBACCO (Burley, Flue-Cured and Dark)

Table 14

| Spartan 4F Use Rate Table (Tobacco) | | | |
|---|----------------------------|-------------|------|
| Preemergence and Preplant Incorporated Applications | | | |
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0 | 4.5 – 6.0 | 6.0 – 8.0 | 8.0 |
| 1.0-3 | 6.0 – 8.0 | 8.0 – 10.1 | 10.1 |
| >3 | 8.0 – 10.1 | 10.1 – 12.0 | 12.0 |

Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Spartan 4F may be surface applied or preplant incorporated (to a depth no greater than 2 inches) from 12 hours to 14 days prior to transplanting tobacco. Incorporating Spartan 4F deeper than 2 inches can result in inconsistent weed control.

Broadcast apply the appropriate Spartan 4F rate from Table 14 above, in a minimum of 10 gallons per acre of water, to the soil prior to transplanting.

Non-Bedded (Fields where raised beds are NOT formed prior to transplanting) Perform all accepted cultural practices for land preparation, fertilizer/fungicide incorporation, etc. prior to the application of Spartan 4F. Once the field has been prepared for planting, Spartan 4F may be surface applied or lightly preplant incorporated from 12 hours up to 14 days prior to transplanting.

If Spartan 4F is surface applied and it is necessary to remove equipment tracks from the field after application but prior to transplanting, any 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.

Bedded (Fields where raised beds ARE formed PRIOR to transplanting) Apply Spartan 4F to formed beds as a surface application from 12 hours to 14 days prior to transplanting. If it is customary to drag / knock down beds prior to transplanting, this procedure must be performed prior to the Spartan 4F application.

When incorporating prior to bedding, Spartan 4F must be thoroughly and uniformly incorporated to a depth no greater than 2 inches to avoid concentrating Spartan 4F 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 of Spartan 4F, and 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.

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

- | | |
|-------------------|------------------------|
| Amaranthus, livid | Lambsquarter, Common |
| Redroot pigweed | Morningglory, Ivyleaf |
| Smooth pigweed | Broadleaf signalgrass |
| Redstem filaree | Morningglory, Tall |
| Prickly sida | Pennsylvania smartweed |
| Hairy Galinsoga | |

When Applied according to directions, Spartan 4F will provide partial control of:

- Nutsedge, yellow (PPI treatments only)
- Morningglory, pitted
- Amaranth, Palmer
- Cocklebur
- Florida pusley

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

Poor agronomic practices, unfavorable pH soils, diseases, cold weather, excessive moisture, drought or other conditions unfavorable to normal plant growth may adversely effect the growth of tobacco transplants. Weakened transplants may be more susceptible to herbicide injury and diseases, particularly under poor drainage or compacted soil conditions or when the soil is saturated for long periods of time. Contact your State Agricultural Extension Service Specialist for consultation as to the agronomic recommendations suited for your tobacco varieties and local

conditions. Temporary stunting of tobacco may occur if transplants are set too shallowly, or if heavy rainfall occurs immediately following transplanting. 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.

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Do not use on Shade Grown Tobacco

Do not apply Spartan 4F to soils classified as sands containing less than 1% organic matter.

Do not use Spartan 4F in tobacco seeding beds or greenhouses.

Do not apply Spartan 4F post-transplant as unacceptable injury may occur.

Do not perform tillage practices that concentrate Spartan 4F into the bed or crop injury may occur

Do not apply more than 12.0 ounces (0.375 lbs active) per acre of Spartan 4F per acre per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application.

VEGETABLE CROPS

Before applying Spartan 4F to vegetable crops, 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.

ASPARGUS

Table 15

| Spartan 4F Use Rate Table (Asparagus) | | | |
|---------------------------------------|----------------------------|-------------|------|
| Spring Preemergence Applications | | | |
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1 | 4.5 – 6.0 | 6.0 – 8.0 | 8.0 |
| 1-3 | 6.0 – 8.0 | 8.0 – 10.1 | 10.1 |
| >3 | 8.0 – 10.1 | 10.1 – 12.0 | 12.0 |

Refer to the use rate information on soil types under the COARSE, MEDIUM, and FINE categories.
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Apply Spartan 4F as a broadcast treatment to crowns established for one or more years.

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

When Applied according to directions, Spartan 4F will provide control of these key weeds:

- | | |
|--------------------------|----------------------|
| Yellow Nutsedge | Common Lambsquarter |
| Palmer Amaranth | Ivyleaf Morningglory |
| Redroot Pigweed | Hairy Galinsoga |
| Smooth Pigweed | |
| Eastern Black Nightshade | |

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the

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instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Do not apply within 14 days prior to harvest.

Do not apply more than 12.0 ounces (0.375 pound active) per acre per 12-month period.

Do not make more than one Spartan 4F application per acre per 12-month period. The twelve-month period is considered to begin upon the initial Spartan application.

Do not apply to soils classified as sand containing less than 1% organic matter.

CABBAGE (Direct seeded, Transplanted)

Table 16

| Spartan 4F Use Rate Table (Cabbage) | | | |
|---|----------------------------|------------|------------|
| Fall or Spring Early Preplant, Preemergence, and Preplant Incorporated Applications | | | |
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0% | 2.25 - 3.0 | 3.0 - 4.5 | 3.0 - 6.0 |
| 1.0-3.0 % | 3.0 - 6.0 | 6.0 - 9.0 | 6.0 - 9.0 |
| >3.0 % | 6.0 - 9.0 | 6.0 - 12.0 | 6.0 - 12.0 |

Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories.
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Early Preplant (Fall Application or Spring Application)

Spartan 4F may be applied in the states of MN, ND, SD, MT, CO, NE, WY, ID, WA, OR, WI, or MI only in the fall or spring preceding the growing season to control or partially control weeds prior to or up to the planting or transplanting of cabbage. Spartan 4F may be applied in the spring from 60 days prior to planting up to planting time. Spartan 4F should be applied to the harvested crop stubble or soil surface without incorporation. Moisture in the form of rain or snow will move and activate the product into the soil. Do not mechanically incorporate in the fall or spring after application as this may destroy the herbicide barrier and weed escapes can occur. Do not apply to frozen soils to prevent Spartan 4F runoff from rain or snow that may occur following application. Spartan 4F may be tankmixed with other burndown herbicides 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 Spartan 4F, 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)

Spartan 4F may be applied as a preplant incorporated treatment in the spring prior to planting or transplanting of cabbage. Shallow incorporation (2 inches or less) is recommended. Spartan 4F can be tankmixed 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.

Pre-Emergence (PRE)

Spartan 4F may be applied pre-emergence as a broadcast or banded treatment to direct seeded or transplanted cabbage.

Transplant Cabbage

Applications should be made broadcast prior to transplanting or as a banded treatment into the row middles within 72 hours after transplanting.

Direct Seeded Cabbage

Applications should be made broadcast within 24 hours following planting or as a banded treatment into the row middles within 72 hours after planting.

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

- | | |
|------------------|----------------------|
| Redroot Pigweed | Common Lambsquarters |
| Common Waterhemp | Tall Waterhemp |
| Hairy Galinsoga | |

When Applied according to directions, Spartan 4F will provide partial control of:

- Velvetleaf

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General

Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Do not apply after crop emerges or if the seedling sprouts are close to the soil surface

Do not apply more than 12 ounces (0.375 pound active) per acre of Spartan 4F per application or per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application.

DRY SHELLED BEANS AND PEAS

Dried cultivars of bean (*Lupinus*); bean (*Phaseolus*) (includes field bean, kidney bean, lima bean (dry), navy bean, pinto bean, tepary bean); bean (*Vigna*) (includes adzuki bean, blackeyed pea, catjang, cowpea, crowder pea moth bean, lentil, mung bean, rice bean, southern pea, urd bean); broad bean (dry); chickpea; guar; lab lab bean; pea (*Pisum*) (includes field pea); pigeon pea.

Table 17

| Spartan 4F Use Rate Table (Dry Shelled Beans Peas) | | | |
|---|----------------------------|------------|------------|
| Fall or Spring Early Preplant, Preemergence, and Preplant Incorporated Applications | | | |
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0% | 2.25 - 3.0 | 3.0 - 4.5 | 3.0 - 4.5 |
| 1.0-3.0 % | 3.0 - 4.5.0 | 3.75 - 6.0 | 4.5 - 6.0 |
| >3.0 % | 3.75 - 6.0 | 4.5 - 6.75 | 5.25 - 8.0 |

Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories.
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Early Preplant and Fall Applications (For use in ND, SD, MT, MN, WY, CO, NE, KS, WI, MI, OR, ID, WA, OR, MT)

Spartan 4F may be applied in the fall as a preplant treatment to control or suppress weeds prior to planting the following spring. Spartan 4F should be applied to the 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 can destroy the herbicide barrier and weed escapes can occur. Do not apply to frozen soils or to existing snow cover to prevent Spartan 4F runoff from rain or snow melt that may occur following application. Spartan 4F may be tank mixed with other residual soil herbicides that are labeled for fall use on dry bean and dry peas. If weeds are emerged at the time of Spartan 4F application, use a burndown herbicide such as glyphosate or paraquat at the full-labeled rate in combination with Spartan 4F or split application as needed. Select the appropriate rate from Table 17 above within the correct soil

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type and organic matter range. When applying Spartan 4F in the fall, use a mid to high rate within the rate range for the appropriate soil type and organic matter.

Early Preplant and Preemergence (Spring Applications)

Spartan 4F may be applied preplant on the soil surface in the spring to control weeds in dry bean and dry peas. Spartan 4F can be applied early preplant prior to planting up to 3 days after planting as a preemerge soil application if seedlings have not broken the soil surface and if the seed furrow is completely closed. For preemerge 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 17. Spartan 4F can be tank mixed with other preemerge herbicides labeled for dry bean and dry peas use. If dry conditions persist following preemerge application of Spartan 4F, a shallow incorporation may be needed to incorporate and activate the herbicide. If weeds are emerged at the time of Spartan 4F application, use a burndown herbicide at the full-labeled rate in combination with Spartan 4F or split application as needed.

Preplant Incorporated (PPI)

Spartan 4F may be applied as a Preplant Incorporated treatment in the spring prior to planting in reduced and conventional tillage dry bean and dry pea. Shallow incorporation (2 inches or less) is recommended. Spartan 4F use rates for PPI applications are similar to those used in preplant and preemergence applications. Spartan 4F can be tankmixed with other burndown or soil-applied herbicides labeled for use in dry bean or 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.

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

- | | |
|-------------------------------------|-----------------------|
| Eastern Black Nightshade | Lambsquarter, Common |
| Redroot Pigweed | Morningglory, Ivyleaf |
| Redstem Filaree | Morningglory, Tall |
| Kochia (ALS and Triazine Resistant) | Smooth Pigweed |
| Tall Waterhemp | Common Waterhemp |
| Russian Thistle | |

When applied according to directions, Spartan 4F will provide partial control of:

- | | |
|-------------------|----------------|
| Biennial wormwood | Wild Buckwheat |
|-------------------|----------------|

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Do not apply more than 8.0 oz (0.25 pound active) total per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application. Do not apply after crop emerges, or if the seedling is close to the soil surface.

HORSERADISH

Table 18

| Spartan 4F Use Rate Table (Horseradish) | | | |
|---|----------------------------|-----------|-----------|
| Fall or Spring Early Preplant, Preemergence, and Preplant Incorporated Applications | | | |
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0% | 2.25 - 4.5 | 3.0 - 4.5 | 3.0 - 4.5 |
| 1.0-3.0 % | 4.5 - 6.0 | 6.0 - 8.0 | 6.0 - 8.0 |
| >3.0 % | 6.0 - 7.5 | 6.0 - 8.0 | 6.0 - 8.0 |

Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Spartan 4F may be applied as an preplant preemerge or preplant incorporated treatment by ground in a minimum of 15 gallons of finished spray.

Early Preplant (Fall Application or Spring Application) (MN, ND, SD, MT, CO, NE, WY, ID, WA, OR, WI, MI)

Spartan 4F may be applied in the fall or spring preceding the growing season to control or suppress weeds prior to or up to the planting of horseradish. Spartan 4F may be applied in the spring from 60 days prior to planting up to planting. Spartan 4F should be applied to the harvested crop stubble or soil surface without incorporation. Moisture in the form of rain or snow will move and activate the product into the soil. Do not mechanically incorporate in the fall or spring after application as this may destroy the herbicide barrier and weed escapes may occur. Do not apply to frozen soils to prevent Spartan runoff from rain or snow that may occur following application. Spartan 4F may be tankmixed 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 Spartan 4F, 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)

Spartan 4F may be applied as a preplant incorporated treatment in the spring prior to planting of horseradish. Shallow incorporation (2 inches or less) is recommended. Spartan 4F can be tankmixed 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.

Pre-Emergence (PRE)

Spartan 4F may be applied pre-emergence 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. Spartan 4F may be applied as a banded treatment into the row middles after crop emergence. Use the higher Spartan 4F rates on clay soils and/or soils with greater than 1% organic matter. Spartan 4F may be applied with other pesticides registered for use on horseradish.

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

- | | |
|----------------------|-----------------|
| Common Lambsquarters | Tall Waterhemp |
| Common Waterhemp | Redroot Pigweed |
| Ivyleaf Morningglory | Yellow Nutsedge |

When applied according to directions, Spartan 4F will provide partial control of:

- Velvetleaf

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It

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is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Do not apply more than 8.0 ounces (0.25 pound active) per acre of Spartan 4F per application or per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application. Do not apply directly on the crop after the crop emerges or if the seedling sprouts are close to the soil surface.

LIMA BEANS, SUCCULENT

Table 19

| Spartan 4F Use Rate Table (Succulent Lima Beans) Spring Preemergence Applications | | | |
|---|----------------------------|------------|------------|
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0% | 2.25 - 3.75 | 3.0 - 6.0 | 3.75 - 6.0 |
| 1.0 - 3.0 % | 3.0 - 4.5 | 3.75 - 6.0 | 4.5 - 6.0 |
| >3.0 % | 3.75 - 6.0 | 4.5 - 6.0 | 5.25 - 6.0 |

Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Spartan 4F may be applied to limas as a preemergence treatment at 6.0 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.

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

- | | |
|-------------------------|----------------------|
| Hophornbeam copperleaf | Smooth Pigweed |
| Redroot Pigweed | Ivyleaf Morningglory |
| Entireleaf Morningglory | |

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

When applying this product with other registered herbicides, refer to specific label information on precautions, instructions, limitations, application methods and timings, and weeds controlled.

Restrictions

Do not apply more than 6.0 ounces(0.1875 pound active) per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application.

Do not apply to coarse soils classified as sand, which have less than 1% organic matter.

OIL CROPS

MINT

Table 20

| Spartan 4F Use Rate Table (Mint) For Dormant and New Planting Applications | | | |
|---|----------------------------|-------------|------|
| Broadcast Rate | Ounces Spartan 4F per acre | | |
| % Organic Matter | Soil Texture | | |
| | Coarse | Medium | Fine |
| <1.0% | 4.5 - 6.0 | 6.0 - 8.0 | 8.0 |
| 1.0 - 3.0 % | 6.0 - 8.0 | 8.0 - 10.1 | 10.1 |
| >3.0 % | 8.0 - 10.1 | 10.1 - 12.0 | 12.0 |

Refer to the previous information on soil types under the COARSE, MEDIUM, and FINE categories
Use higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the rate range.

Dormant Applications

Apply Spartan 4F to established stands of dormant mint after post harvest and / or spring land cultivation has been completed and before emergence of new mint growth.

Split applications of Spartan 4F may be used for preemergence sequential 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 and before emergence of new mint growth.

Apply Spartan 4F 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.

Spartan 4F may also be applied in tank mixtures with other products registered for use in mint.

New Planting Applications

Spartan 4F may be applied to new mint plantings preemergence to the weeds and mint. The rate of application should be reduced approximately twenty five percent of the rate recommended for established plantings for particular soil characteristics. Refer to Spartan Use Rate Table (Table 20) 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.

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

- | | |
|-------------------------------------|--------------------|
| Common Lambsquarters | Tall Waterhemp |
| Common Waterhemp | Redroot Pigweed |
| Powell Amaranth | Russian Thistle |
| Ivyleaf Morningglory | Yellow Nutsedge |
| Kochia (ALS and Triazine Resistant) | Hairy nightshade |
| Eastern Black Nightshade | Mayweed Chamomile |
| Yellow Toadflax | Catchweed Bedstraw |
| Shepardspurse | |

When applied according to directions, Spartan 4F will provide partial control of:

- | | |
|-----------------|-------------------|
| Velvetleaf | Field Bindweed |
| Prickly Lettuce | Annual sowthistle |

For information on other weeds not listed above, refer to Weed Controlled section (Table 6) in this label.

Precautions

Applications made to mint that has emerged will result in severe injury to exposed plant tissue.

Applications are recommended only to healthy mint fields. Applications to mint under stress from disease, pests and cultural or environmental conditions may result in crop injury.

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

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F (sulfentrazone) and the primary soil and environmental factors, which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under General Application Instructions, General Spartan 4F Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Spartan 4F. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F under specific local conditions.

Restrictions

Apply Spartan 4F only to dormant mint or new mint plantings before new growth emerges.

Do not apply more than 12 ounces (0.375 pound active) per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan application.

TURF

Spartan 4F may be applied to turf by ground application equipment (broadcast or spot treatment) at rates from 0.5 to 1.0 fluid ounce of product per acre.

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Dealers Should Sell in Original Packages Only.

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.

The Directions for Use of this product should be followed 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 beyond the control of FMC or Seller. All such risks shall be assumed by Buyer and User, and Buyer and User agree to hold FMC and Seller harmless for any claims relating to such factors.

Seller warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the Directions for Use when used in accordance with the directions under normal conditions of use. FMC MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, NOR ANY OTHER EXPRESS OR IMPLIED WARRANTIES WITH RESPECT TO THE SELECTION, PURCHASE, OR USE OF THIS PRODUCT. Any warranties, express or implied, having been made are inapplicable if this product has been used contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to (or beyond the control of) seller or FMC, and buyer assumes the risk of any such use.

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Vegetable Disclaimer

FMC Corporation intends to offer this product only to those end users and/or growers who have liability and indemnification agreements with FMC Corporation for failure to perform and crop damage from use of Spartan 4F on Asparagus, Cabbage, Dry Shell Pea and Beans, Horseradish and Limas. If, after purchasing the product, the release of liability and indemnification is unacceptable to the user/grower, FMC Corporation requests that the user/grower return Spartan 4F to the place of purchase at once unopened.

This product when used on Asparagus, Cabbage, Dry Shell Pea and Beans, Horseradish and Limas may lead to crop injury, loss, or damage. FMC Corporation recommends that the user and/or grower test product in order to determine its suitability for such intended use. FMC Corporation makes the product available to the user and/or grower solely to the extent the benefit and utility, in the sole opinion of the user and/or grower, outweigh the extent of potential injury associated with the use of this product. The decision to use or not to use this herbicide must be made by each individual user/grower on the basis of possible crop injury from Spartan 4F, the severity of weed infestation, the cost of alternative weed controls and other factors, because of the risk of crop damage all such use is at the user's and/or grower's risk.

This Conditions of Sale and Limitation of Warranty and Liability may not be amended by any oral or written agreement.

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