

SPARTAN[®]



4F

HERBICIDE

For Use Only by Individuals/Firms Certified And/or Licensed as Pesticide Applicators

EPA Reg. No. 279-3220	EPA Est 279-IL-1
Active Ingredient: (1.0)	By Wt-
Sulfentrazone	39.6%
Inert Ingredients:	60.4%
	100.0%

Contains 4 pounds of active ingredient per gallon.

KEEP OUT OF REACH OF CHILDREN CAUTION

FIRST AID (2.0)

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.

HOTLINE NUMBER (3.0)

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-331-3148 for emergency medical treatment information.

Note to Physician: Sulfentrazone is expected to have low oral and dermal toxicity, and moderate inhalation toxicity. It is expected to be slightly irritating to the skin and minimally irritating to the eyes. Treatment is otherwise controlled removal of exposure followed by symptomatic and supportive care.

See other sections for precautionary information.

ACTIVE INGREDIENT MADE IN CHINA AND FORMULATED AND PACKAGED IN USA.

ATTENTION

Although this label may appear similar to the label on a product you may have used, there may be important label differences. Users must read, understand and strictly follow all label directions, precautions and restrictions.

It is the user's responsibility to be sure the product is approved for sale or use on the intended crop and for use in the specific geographic area.

It is the user's responsibility to be aware of and to follow all State or local precautions or restrictions not appearing on this product label.

Prior to purchase or use of this product, read the Terms of Sale or Use and Limitation of Warranty and Liability on page 2 of this label. If the terms and conditions are unacceptable, return the product immediately in the original and unopened container.

Sold By



FMC Corporation
2929 Walnut Street
Philadelphia, PA 19104

Net Contents: 1 Gallon

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PRECAUTIONARY STATEMENTS (4.0)

Hazards to Humans and Domestic Animals (4.1)

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) (4.2)

Applicators and other handlers must wear: long-sleeved shirt and long pants, chemical-resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride, 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.

Environmental Hazards (4.3)

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 (4.4)

Do not use or store near heat or open flame.

DIRECTIONS FOR USE (5.0)

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 3. The twelve-month period is considered to begin upon the initial Spartan 4F application.

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

AGRICULTURAL USE REQUIREMENTS (5.1)

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.

Personal Protective Equipment (PPE) required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is: Coveralls over long-sleeved shirt and long pants, chemical-resistant gloves made of any waterproof material, and shoes plus socks.

STORAGE AND DISPOSAL (5.2)

Do not contaminate water, food or feed by storage or disposal. Do not use or store around the home.

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

In case of spill, avoid contact, isolate area and keep out animals and unprotected persons. Confine spills. Call CHEMTREC (Transportation and spills): (800) 424-9300.

To Confine Spill

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

Waste resulting from the use of this product may be disposed of at an approved waste disposal facility.

Container Disposal

Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: (For containers greater than 5 gallons) Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. (For containers 5 gallons or less) Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Triple rinse (or equivalent). Then offer for recycling if available, or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

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

CONDITIONS OF SALE AND LIMITATIONS OF WARRANTY AND LIABILITY (6.0)

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 must 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, to the extent consistent with applicable law, 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. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, 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, to the extent consistent with applicable law, buyer assumes the risk of any such use.

To the extent consistent with applicable law, FMC or seller shall not be liable for any incidental, consequential or special damages resulting from the use or handling of this product. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF FMC AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF FMC OR SELLER, THE REPLACEMENT OF THE PRODUCT.

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

RESISTANCE MANAGEMENT (7.0)

Some weeds are known to develop resistance to herbicides that have been used repeatedly. While the development of herbicide resistance is well understood, it is not easily predicted. Therefore herbicides should be used in conjunction with the resistance management strategies in the area. Consult the local or State agricultural advisors for details. If herbicide resistance should develop in the area, this product used alone may not continue to provide sufficient levels of weed control. If the reduced levels of control can not be attributed to improper application techniques, improper use rates, improper application timing, unfavorable weather conditions or abnormally high weed pressure, a resistant strain of weeds may have developed.

To reduce the potential for weed resistance use this product in a rotation program with other classes of chemistry and modes of action. Always apply this product at the recommended rates and in accordance with the use directions. Do not use less than recommended label rates alone or in tank mixtures. Do not use reduced rates of the tank mix partner. For optimum performance, scout fields carefully and begin applications when weeds are smaller rather than larger. If resistance is suspected, contact the local or State agricultural advisors.

PRODUCT INFORMATION (8.0)

Spartan 4F is a selective soil-applied herbicide for the control of susceptible broadleaf, grass and sedge weeds. Spartan 4F is formulated as a 4 pounds 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 4F treatment, a shallow incorporation may be needed to obtain desired weed control. When activating moisture is received after dry conditions, Spartan 4F will provide a reduced level of control of susceptible germinating weeds. Soil applications of Spartan 4F must be made before crop seed germination to prevent injury to the emerging crop seedlings. When applications after planting are delayed, injury may occur if seeds are germinating or if they are located near the soil surface.

Observe all instructions, crop restrictions, mixing directions, application precautions, replanting directions, rotational crop guidelines and other label information of each product when tank mixing with Spartan 4F.

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 pads or properly diked mixing/loading areas.

Operations that involve mixing, loading, rinsing, or washing of this product into or from pesticide handling or application equipment or containers within 50 feet of any well are prohibited unless conducted on an impervious pad constructed to withstand the weight of the heaviest load that may be positioned on or moved across the pad. 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 INSTRUCTIONS (9.0)

Spartan 4F may be applied to soil as a preplant incorporated treatment or as a pre-emergence (prior to weed and/or crop emergence) 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. Do not incorporate to a depth greater than 2 inches which may result in poor weed control. 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.

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 till. 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 and/or irrigation is 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.

SPARTAN 4F HERBICIDE PRODUCT USE RATES (10.0)

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 4F use directions and restrictions for each crop as defined in subsequent sections of this label. The user is cautioned that some crops respond differently to 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 (10.1)

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 (10.2)

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 1.

SOIL CLASSIFICATION CHART

Table 1

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 4F 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. Accurate soil pH information will require 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.

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.

APPLICATION INFORMATION (11.0)

Ground Application (11.1)

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/or 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.

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

Aerial Application (11.2)

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.

Chemigation Application (11.3)

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, application timing, amount and pH of the 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.

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.

Application with Dry Fertilizers (11.4)

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

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

Apply Spartan 4F/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 4F/dry fertilizer mixture.

Impregnation Directions (11.41)

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 4F/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 4F onto the fertilizer during mixing.

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

Apply the 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.

A minimum of 200 pounds of dry bulk fertilizer impregnated with the recommended amount of Spartan 4F must be applied per acre to achieve adequate soil coverage for satisfactory weed control.

DO NOT impregnate Spartan 4F onto coated ammonium nitrate or limestone because these materials will not absorb the herbicide.

Refer to the appropriate crop section of the Spartan 4F label to determine the rate of Spartan 4F to be applied per acre. Use the following table to determine the amount of Spartan 4F 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 4F to be impregnated on a ton of dry bulk fertilizer using the following formula:

$$\frac{2000}{\text{pounds dry fertilizer per acre}} \times \text{Spartan 4F use rate} = \begin{matrix} \text{Ounces of Spartan 4F} \\ \text{in fluid ounces per acre} \\ \text{to be applied per ton of fertilizer} \end{matrix}$$

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

Table 2

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

Application with Liquid Fertilizer (11.5)

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 for Liquid Fertilizer Applications (11.6)

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 4F/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.

Do not premix Spartan 4F spray solutions in nurse tanks.

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.

SPRAY DRIFT REDUCTION ADVISORY (12.0)

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 (12.1)

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 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 (12.2)

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage 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 (12.3)

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. This orientation usually produces larger droplets as compared to other nozzle orientations. Significant nozzle deflection from horizontal will reduce droplet size and increase drift potential.

Nozzle Type - 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 1/3 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.

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, the movement of smoke from a ground source or an aircraft smoke generator can also identify inversions. 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 for potential crop effects that may result from such misapplication of Spartan 4F.

MAXIMUM ALLOWABLE SPARTAN 4F

USE PER ACRE PER 12 MONTH PERIOD* (13.0)

Refer to the crop section of this label for specific product use directions.

Table 3

Crop	Ounces Spartan 4F Per Acre	Pound Active Sulfentrazone Per Acre
Row Crops		
Soybeans	12.0	0.375
Sugarcane	12.0	0.375
Sunflowers	8.0	0.25
Tobacco	12.0	0.375
Vegetable Crops		
Cabbage	12.0	0.375
Dry Peas	8.0	0.25
Horseradish	8.0	0.25
Lima Beans (Succulent)	6.0	0.1875
Strawberry	12.0	0.375
Tomato (Transplanted Only)	12.0	0.375
Oil Crops		
Flax	12.0	0.375
Mint	12.0	0.375
Sod Production		
Turf	12.0	0.375
Permanent Crops		
Caneberry	12.0	0.375
Pistachio		
Walnut (black & English)		
Lemon		
Orange		
Grapes: Wine, Raisin, Table and Juice		
Blueberries		
Bushberry		

*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 4F application.

CROP ROTATIONAL RESTRICTIONS (14.0)

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 accurately determine the planned crop's sensitivity to sulfentrazone.

CROP ROTATIONAL RESTRICTIONS**

Table 4

Crop	Interval (Months)
Alfalfa	12
Almond	Anytime
Asparagus	Anytime
Barley	4
Blueberries	Anytime
Bushberry	Anytime
Cabbage	Anytime
Caneberry	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 Peas	Anytime
Flax	Anytime
Grapes: Wine, Raisins, Table and Juice	Anytime
Horseradish	Anytime
Limas	Anytime
Lemon	Anytime
Mint	Anytime
Orange	Anytime
Peanuts	Anytime
Pistachio	Anytime
Potatoes	Anytime
Rice	10
Rye	4
Sorghum	10*
Soybeans	Anytime
Strawberry	Anytime
Sugar Beets	36
Sugarcane	Anytime
Sunflowers	Anytime
Sweet Potatoes	12
Triticale	4
Tobacco	Anytime
Tomato (Transplanted Only)	Anytime
Turf	Anytime
Walnut (Black and English)	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.

BAND TREATMENT APPLICATIONS (15.0)

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

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

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

MIXING AND LOADING INSTRUCTIONS (16.0)

Spartan 4F may be applied alone, or in tank mixtures 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.

It is important that spray equipment is clean and free of existing pesticide residues before preparing Spartan 4F spray mixtures. Follow the spray tank clean out procedures specified on the label of the product or products previously applied.

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 4F/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 4F is thoroughly mixed before application or before adding another product to the spray tank.

Use 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.

Do not premix Spartan 4F spray solutions in nurse tanks.

If Spartan 4F is tank mixed with other herbicides, all additional directions, restrictions and precautions for the tank mixture herbicides must be followed.

SPRAYER EQUIPMENT CLEAN-OUT (17.0)

As soon as possible after spraying Spartan 4F and before using sprayer equipment for any other applications, the sprayer must be thoroughly cleaned to avoid potential crop effects using the following procedure. Residues left in mixing equipment, spray tanks, hoses, spray booms and nozzles can cause crop effects if they are not properly cleaned. In addition, users must take appropriate steps to ensure proper equipment clean-out for any other products mixed with Spartan 4F as required on the other product labels. More complete cleaning can be achieved if the spray system is cleaned immediately following the application.

1. Drain sprayer tank, hoses, spray boom and spray nozzles. Use a high-pressure detergent wash to remove physical sediment and residues from the inside of the sprayer tank and thoroughly rinse. Then, thoroughly flush sprayer hoses, spray boom and spray nozzles with a clean water rinse. Remove and clean spray tips and all filters and screens (tank, spray hose and spray tips) separately in the ammonia solution of Step 2.
2. Next, prepare a sprayer cleaning solution by adding three gallons of ammonia (containing at least 3% active) per 100 gallons of clean water. Prepare sufficient cleaning solution to allow the operation of the spray system for a minimum of 15 minutes to thoroughly flush hoses, spray boom and spray nozzles.
3. Convenient and thorough cleaning of the sprayer can be achieved if the ammonia solution or fresh water is left in the spray tank, hoses, spray booms and spray nozzles overnight or during storage.
4. Before using the sprayer, completely drain the sprayer system. Rinse the tank with clean water and flush through the hoses, spray boom, and spray nozzles with clean water. Remove and clean spray tips and all filters and screens (tank, spray hose and spray tip) separately in an ammonia solution.
5. Properly dispose of all cleaning solution and rinsate in accordance with Federal, State, and local regulations and guidelines. Do not apply sprayer cleaning solutions or rinsate to sensitive crops.

Do not store the sprayer overnight or for any extended period of time with Spartan 4F spray solution remaining in the tank, spray lines, spray boom plumbing, spray nozzles or strainers.

If the sprayer has been stored or idle, purge the spray boom and nozzles with clean water before beginning any application.

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

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.

WEEDS LIST (18.0)

When Spartan 4F is applied in accordance with the Application information and the specific crop use directions, Spartan 4F applied alone or in recommended tank mixtures will provide control of the following weeds. Refer to the specific crop section.

Table 5

Common Name	Scientific Name	Common Name	Scientific Name
Amaranth, livid	<i>Amaranthus lividus</i>	Morningglory, palmleaf	<i>Ipomoea wrightii</i>
Amaranth, Palmer	<i>Amaranthus palmeri</i>	Morningglory, purple	<i>Ipomoea turbinata</i>
Amaranth, Powell	<i>Amaranthus Powell II</i>	Morningglory, red	<i>Ipomoea, coccinea L.</i>
Amaranth, spiny	<i>Amaranthus spinosus</i>	Morningglory, scarlet	<i>Ipomoea coccinea</i>
Amaranth, spleen	<i>Amaranthus dubius</i>	Morningglory, smallflower	<i>Jacquemontia tamnifolia</i>
Anoda, spurred	<i>Anoda cristata</i>	Morningglory, tall	<i>Ipomoea, purpurea</i>
Bedstraw, catchweed	<i>Galium aparine</i>	Mustard, tumble	<i>Sisymbrium altissimum</i>
Carpetweed	<i>Mollugo verticillata</i>	Nightshade, black	<i>Solanum nigrum</i>
Chickweed, common	<i>Stellaria media</i>	Nightshade, Eastern black	<i>Solanum ptycanthum</i>
Copperleaf, hophornbeam	<i>Acalypha ostryeafolia</i>	Nutsedge, purple	<i>Cyperus rotundus</i>
Copperleaf, Virginia	<i>Acalypha virginica</i>	Nutsedge, yellow	<i>Cyperus esculentus</i>
Crabgrass, large	<i>Digitaria sanguinalis</i>	Orchardgrass	<i>Dactylis glomerata</i>
Crabgrass, smooth	<i>Digitaria ischaemum</i>	Panicum, fall	<i>Panicum dichotomiflorum</i>
Crabgrass, Southern	<i>Digitaria ciliaris</i>	Pigweed, redroot	<i>Amaranthus retroflexus</i>
Croton, tropic	<i>Croton glandulosus</i>	Pigweed, smooth	<i>Amaranthus hybridus</i>
Crownbeard, golden	<i>Verbesina encelioides</i>	Plantain, blackseed	<i>Plantago rugelii decne</i>
Cupgrass, woolly	<i>Erichloa villosa</i>	Plantain, narrow-leaved	<i>Plantago lanceolata</i>
Cyperus, hedgehog	<i>Cyperus compressus</i>	Poorjoe	<i>Diodia teres</i>
Daisy, American	<i>Eclipta alba</i>	Porophyllum	<i>Porophyllum rederale</i>
Devilsclaw	<i>Proboscidea louisiana</i>	Poinsettia, wild	<i>Euphorbia heterophylla</i>
Dock, curly	<i>Rumex crispus</i>	Purslane, common	<i>Portulaca oleracea</i>
Eclipta	<i>Eclipta prostrata</i>	Redmaids	<i>Calandrinia ciliata</i>
Filaree, redstem	<i>Erodium cicutarium</i>	Redweed	<i>Melochia corchorifolia</i>
Flixweed	<i>Descurainia sophia</i>	Sedge, annual	<i>Carex spp.</i>
Galinsoga, hairy	<i>Galinsoga ciliata</i>	Senna, coffee	<i>Cassia occidentalis</i>
Goosegrass	<i>Eleusine indica</i>	Sheperdspurse	<i>Capsella bursa-pastoris</i>
Groundcherry, clammy (seedling)	<i>Physalis heterophylla</i>	Sida, prickly	<i>Sida spinosa</i>
Groundcherry, cutleaf	<i>Physalis angulata</i>	Sida, Southern	<i>Sida acuta</i>
Jimsonweed	<i>Datura stramonium</i>	Smartweed, PA (seedling)	<i>Polygonum pensylvanicum</i>
Kochia (ALS and Triazine Resistant)	<i>Kochia scoparia</i>	Smellmellon	<i>Cucumis melo</i>
Ladysthumb	<i>Polygonum persicaria</i>	Starbur, bristly	<i>Acanthospermum hispidum</i>
Lambsquarters, common	<i>Chenopodium album</i>	Stinkgrass	<i>Eragrostis cilianensis</i>
Lettuce, miners	<i>Montia perfoliata</i>	Toadflax, yellow	<i>Linaria vulgaris</i>
Mallow, common	<i>Malva neglecta wall r.</i>	Tassleflower, red	<i>Emilio sonchifolia</i>
Mayweed, Chamomile	<i>Anthemis cotula I</i>	Thistle, Russian	<i>Salsola kali</i>
Milkweed, honeyvine	<i>Ampelamus albidus</i>	Waterhemp, common	<i>Amaranthus rudis</i>
Morningglory, entireleaf	<i>Ipomoea hederacea integriuscula</i>	Waterhemp, tall	<i>Amaranthus tuberculatos</i>
Morningglory, ivyleaf	<i>Ipomoea hederacea hederacea</i>	Waterprimrose, winged	<i>Ludwigia decurrens</i>
		Witchgrass	<i>Panicum capillare</i>

REPLANTING INSTRUCTIONS (19.0)

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 other herbicide containing sulfentrazone. 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.

ROW CROPS

SOYBEANS (20.0)

Table 6

Spartan 4F Use Rate Table (Soybeans)			
Fall, Spring Early Preplant, Preemergence, and Preplant Incorporated Applications			
Broadcast Rate	Fluid Ounces Spartan 4F per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5	4.5 – 6.0	6.0 – 8.0	8.0
1.5-3	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 (20.1)

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 6. Spartan 4F may be applied 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 (20.2)

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 after planting, 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 (20.3)

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 or bedded.

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.

Weeds Controlled

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

Amaranth, Palmer	Nightshade
Copperleaf, hophornbeam	Pigweed, spp.
Kochia (ALS and Triazine Resistant)	Sida, prickly
Lambsquarters, common	Thistle, Russian
Morningglory, spp.	Waterhemp, spp.

For information on other weeds not listed above, refer to Weed Controlled section (Table 5) in this label.

Precautions

When applying Spartan 4F 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 Application Instructions, 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 fluid 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 4F application.

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

Do not apply to frozen soils or existing snow cover to prevent Spartan 4F runoff from rain or snowmelt that may occur following application. Do not apply after crop seed germination.

SUGARCANE (21.0)

Table 7

Spartan 4F Use Rate Table (Sugarcane)			
Planting Time and Lay-by Applications			
Broadcast Rate	Fluid Ounces Spartan 4F per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5	4.5 – 6.0	6.0 – 8.0	8.0
1.5-3	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 7 for specific use information.

Planting Time Applications (21.1)

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 (21.2)

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 aerial application in sugarcane.

Lay-by Applications (21.3)

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.

Weeds Controlled

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

Morningglory, entireleaf	Morningglory, tall
Morningglory, ivyleaf	Pigweed, red root
Morningglory, red	Nutsedge, yellow

For information on other weeds not listed above, refer to Weed Controlled section (Table 5) 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 Application Instructions, 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 120 days of harvest.

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

Do not allow spray to contact crop leaves.

Do not apply more than 12.0 fluid ounces (0.375 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 4F application.

SUNFLOWERS (22.0)

Table 8

Spartan 4F Use Rate Table (Sunflowers)			
Fall, Early Spring Preplant, Preemergence, and Preplant Incorporated Applications			
Broadcast Rate	Fluid Ounces Spartan 4F per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5	3.0 - 3.75	3.0 – 4.5	3.75 – 5.25
1.5-3.0	3.0 – 4.5	3.75 – 6.0	4.5 – 6.75
>3	3.75 – 6.0	4.5 – 6.75	6.0 – 8.0

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 Applications (For use only in ND, SD, MT, MN, WY, CO, NE, KS) (22.1)

Spartan 4F may be applied in the fall as a preplant treatment to control or suppress weeds prior to planting sunflowers 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 allowing weed escapes to 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 sunflowers. 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 8 above within the correct soil 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) (22.2)

Spartan 4F may be applied preplant on the soil surface in the spring to control weeds in sunflowers. Spartan 4F can be applied early preplant prior to planting up to 3 days after planting as a preemergence soil application if seedlings have not broken the soil surface and if the seed furrow is completely closed. For preemergence 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 8). Spartan 4F can be tank mixed with other preemergence herbicides labeled for sunflower use. If dry conditions persist following preemergence 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) (22.3)

Spartan 4F may be applied as a Preplant Incorporated treatment in the spring prior to planting in reduced and conventional tillage sunflowers. Spartan 4F should be shallowly incorporated in the soil no deeper than 2 inches. Incorporating Spartan 4F deeper than 2 inches can result in inconsistent weed control. Use the appropriate rate from Table 8 above for the soil texture, organic matter, and pH level. Spartan 4F can be tankmixed with other soil-applied herbicides labeled for preplant incorporation in sunflowers.

Weeds Controlled

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

Amaranth, Palmer	Pigweed, red root
Filaree, redstem	Pigweed, smooth
Kochia (ALS and Triazine Resistant)	Sida, prickly
Lambsquarters, common	Thistle, Russian
Morningglory, ivyleaf	Waterhemp, common
Morningglory, tall	Waterhemp, tall
Nightshade, Eastern black	

For information on other weeds not listed above, refer to Weed Controlled section (Table 5) in this label.

Precautions

When applying Spartan 4F to coarse textured soils, it is recommended that growers allow a minimum of 7-14 days from application to planting. Best results are achieved with Spartan 4F when applications are made early preplant and greater than 14 days before planting.

Some adverse crop response may occur on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.8 or higher, or on highly eroded soils, or in areas of calcareous outcroppings. Spartan 4F use rates should be reduced in those areas. Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response. As expected, poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases may also cause undesirable crop response.

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 Application Instructions, 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 fluid ounces (0.25 pound active) of Spartan 4F per twelve-month period to sunflowers. The twelve-month period is considered to begin upon the initial Spartan 4F application.

Do not apply to frozen soils or existing snow cover to prevent Spartan 4F runoff from rain or snowmelt that may occur following application.

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

Do not incorporate greater than 2 inches deep.

TOBACCO (Burley, Flue-Cured and Dark) (23.0)

Table 9

Spartan 4F Use Rate Table (Tobacco)			
Preemergence and Preplant Incorporated Applications			
Broadcast Rate	Fluid Ounces Spartan 4F per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5	4.5 – 6.0	6.0 – 8.0	8.0
1.5-3	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 14 days to 12 hours 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 9 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) (23.1)

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 14 days to 12 hours 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) (23.2)

Apply Spartan 4F to formed beds as a surface application from 14 days to 12 hours 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, or any other herbicide containing sulfentrazone. 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.

Weeds Controlled

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

Amaranthus, livid	Pigweed, redroot
Filaree, redstem	Pigweed, smooth
Galinsoga, hairy	Sida, prickly
Lambsquarters, common	Signalgrass, broadleaf
Morningglory, ivyleaf	Smartweed, Pennsylvania
Morningglory, tall	

For information on other weeds not listed above, refer to Weed Controlled section (Table 5) 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 response and diseases, particularly under poor drainage or compacted soil conditions or when the soil has been 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 Application Instructions, 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 fluid 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 4F application.

Do not incorporate greater than 2 inches deep.

VEGETABLE CROPS

Before applying Spartan 4F to vegetable crops, users, producers, and/or applicators must read and follow the information presented in the Conditions of Sale and Limitation of Warranty and Liability section on page 2 of this label.

CABBAGE Processing Only (Transplanted Only) (24.0)

Table 10

Spartan 4F Use Rate Table (Cabbage)			
Fall or Spring Early Preplant, Preemergence, and Preplant Incorporated Applications			
Broadcast Rate	Fluid Ounces Spartan 4F per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5%	2.25 – 3.0	3.0 – 4.5	3.0 – 6.0
1.5-3.0 %	3.0 – 6.0	6.0 – 9.0	6.0 – 9.0
>3.0 %	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 (Spring Application) (24.1)

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 tank mixed 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) (24.2)

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

Transplant Cabbage (24.3)

Spartan 4F may be applied pre-emergence as a broadcast or banded treatment to transplanted cabbage only. Applications should be made broadcast or banded treatment prior to transplanting. Spartan 4F may be applied as a banded treatment into the row middles within 72 hours after transplanting.

Weeds Controlled

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

Galinsoga, hairy	Waterhemp, common
Lambsquarters, common	Waterhemp, tall
Pigweed, redroot	

For information on other weeds not listed above, refer to Weed Controlled section (Table 5) 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 Application Instructions, 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 fluid 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 4F application.

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

Do not incorporate to depths greater than 2 inches.

DRY PEAS (25.0)

Only for use on Chickpea and Dry Field Pea

Table 11

Spartan 4F Use Rate Table (Dry Peas)			
Fall or Spring Early Preplant, Preemergence, and Preplant Incorporated Applications			
Broadcast Rate	Fluid Ounces Spartan 4F per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5%	2.25 – 3.0	3.0 – 4.5	3.0 – 4.5
1.5-3.0 %	3.0 – 4.5	3.75 – 6.0	4.5 – 6.0
>3.0 %	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 only in ND, SD, MT, MN, WY, CO, NE, KS, WI, MI, OR, ID, WA, OR, MT) (25.1)

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 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 11 above within the correct soil 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) (25.2)

Spartan 4F may be applied preplant on the soil surface in the spring to control weeds in dry peas. Spartan 4F can be applied early preplant prior to planting up to 3 days after planting as a preemergence soil application if seedlings have not broken the soil surface and if the seed furrow is completely closed. For preemergence 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 11. Spartan 4F can be tank mixed with other preemergence herbicides labeled for dry peas use. If dry conditions persist following preemergence 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) (25.3)

Spartan 4F may be applied as a Preplant Incorporated treatment in the spring prior to planting in reduced and conventional tillage in dry pea. Do not incorporate to depths greater than 2 inches. Spartan 4F use rates for PPI applications are similar to those used in preplant and preemergence applications. Spartan 4F can be tank mixed 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.

Weeds Controlled

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

Amaranth, Palmer	Pigweed, red root
Filaree, redstem	Pigweed, smooth
Kochia (ALS and Triazine Resistant)	Sida, prickly
Lambsquarters, common	Thistle, Russian
Morningglory, ivyleaf	Waterhemp, common
Morningglory, tall	Waterhemp, tall
Nightshade, Eastern black	

For information on other weeds not listed above, refer to Weed Controlled section (Table 5) in this label.

Precautions

When applying Spartan 4F to coarse textured soils, it is recommended that growers allow a minimum of 7-14 days from application to planting. Best results are achieved with Spartan 4F when applications are made early preplant and greater than 14 days before planting.

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

Some adverse crop response may occur on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.8 or higher, or on highly eroded soils, or in areas of calcareous outcroppings. Spartan 4F use rates should be reduced in those areas. Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response. As expected, poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases may also cause undesirable crop response.

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 Application Instructions, 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 fluid ounces (0.25 pound active) total per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan 4F application.

Do not apply after crop emerges, or if the seedling is close to the soil surface. Do not incorporate to depths greater than 2 inches.

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

TOMATO (Transplanted Only) (26.0)

Table 12

Spartan 4F Herbicide Use Rate Table (Tomato, Transplanted Only)			
Preplant Applications			
Broadcast Rate	Fluid Ounces Spartan 4F Herbicide per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5%	2.25 – 3.0	3.0 – 4.5	3.0 – 6.0
1.5 – 3.0 %	3.0 – 6.0	6.0	6.0 – 8.0
>3.0 %	6.0 – 8.0	8.0	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 lowest rates for pH greater than 7.0 within the rate range.

Preplant Applications (26.1)

Spartan 4F Herbicide may be applied preemergence as a broadcast or banded treatment on tomato (Transplanted only). Applications must be made prior to transplant.

Weeds Controlled

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

Lambsquarters, common	Pigweed, redroot
Morningglory, ivyleaf	Waterhemp, common
Nutsedge, yellow	Waterhemp, tall

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F Herbicide (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 Application Instructions, Spartan 4F Herbicide 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 Herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F Herbicide under specific local conditions.

Restrictions

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

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

HORSERADISH (27.0)

Table 13

Spartan 4F Use Rate Table (Horseradish)			
Fall or Spring Early Preplant, Preemergence, and Preplant Incorporated Applications			
Broadcast Rate	Fluid Ounces Spartan 4F per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5%	2.25 – 4.5	3.0 – 4.5	3.0 – 4.5
1.5-3.0 %	4.5 – 6.0	6.0 – 8.0	6.0 – 8.0
>3.0 %	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 preemergence or preplant incorporated treatment by ground in a minimum of 15 gallons of finished spray.

Preplant Incorporated (PPI) (27.1)

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

Pre-Emergence (PRE) (27.2)

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.

Weeds Controlled

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

Lambsquarters, common	Pigweed, redroot
Morningglory, ivyleaf	Waterhemp, common
Nutsedge, yellow	Waterhemp, tall

For information on other weeds not listed above, refer to Weed Controlled section (Table 5) 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 Application Instructions, 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 fluid 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 4F application.

Do not apply directly on the crop after the crop emerges or if the seedling sprouts are close to the soil surface. Do not use on soils classified as sand, which have less than 1% organic matter.

Do not incorporate to depths greater than 2 inches.

STRAWBERRY (28.0)

Table 14

Spartan 4F Herbicide Use Rate Table (Strawberry) Preemergence Applications			
Broadcast Rate	Fluid Ounces Spartan 4F Herbicide per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5%	4.0	4.0 – 4.5	4.0 – 6.0
1.5 – 3.0 %	4.0	4.0 – 8.0	4.0 – 8.0
>3.0 %	4.0 – 8.0	4.0 – 8.0	4.0 – 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 lowest rates for pH greater than 7.0 within the rate range.

Preemergence (28.1)

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

Weeds Controlled

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

Corn spurry	Pineapple weed
Field Pansy	Prostrate knotweed
Groundsel, common	Sheperdspurse
Ladysthumb	Waterhemp, common
Lambsquarters, common	Waterhemp, tall
Mayweed	White Campion
Morningglory, ivyleaf	Wild buckwheat
Nutsedge, yellow	Yellow nutsedge
Pigweed, redroot	Yellow woodsorrel

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F Herbicide (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 Application Instructions, Spartan 4F Herbicide 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 Herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F Herbicide under specific local conditions.

Restrictions

Do not apply more than 8 fluid ounces (0.25 pound active) per acre of Spartan 4F Herbicide per application or 12 fluid ounces (0.375 pound active) per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan 4F 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) (29.0)

(Tennessee Only)

Table 15

Spartan 4F Use Rate Table (Succulent Lima Beans) Preemergence Applications			
Broadcast Rate	Fluid Ounces Spartan 4F per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5%	2.25 – 3.75	3.0 – 6.0	3.75 – 6.0
1.5 – 3.0 %	3.0 – 4.5	3.75 – 6.0	4.5 – 6.0
>3.0 %	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 fluid ounces (0.1875 pounds active) per acre. Applications should be made with ground equipment in a minimum of 10 gallons of finished spray per acre.

Weeds Controlled

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

Copperleaf, hophornbeam	Pigweed, redroot
Morningglory, entireleaf	Pigweed, smooth
Morningglory, ivyleaf	

For information on other weeds not listed above, refer to Weed Controlled section (Table 5) in this label.

Precautions

When applying Spartan 4F to coarse textured soils, it is recommended that growers allow a minimum of 7-14 days from application to planting. Best results are achieved with Spartan 4F when applications are made early preplant and greater than 14 days before planting.

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

Some adverse crop response may occur on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.8 or higher, or on highly eroded soils, or in areas of calcareous outcroppings. Spartan 4F use rates should be reduced in those areas. Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response. As expected, poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases may also cause undesirable crop response.

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 Application Instructions, 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 6.0 fluid ounces (0.1875 pound active) per twelve-month period. The twelve-month period is considered to begin upon the initial Spartan 4F application.

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

Do not incorporate.

OIL CROPS

FLAX (30.0)

Table 16

Spartan 4F Herbicide Use Rate Table (Flax) Preemergence Applications			
Broadcast Rate	Fluid Ounces Spartan 4F Herbicide per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5%	3.0 – 3.75	3.0 – 4.5	3.75 – 5.25
1.5 – 3.0 %	3.0 – 4.5	3.75 – 6.0	4.5 – 6.75
>3.0 %	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 lowest rates for pH greater than 7.0 within the rate range.

Preemergence (30.1)

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

Weeds Controlled

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

Copperleaf, hophornbeam	Morningglory, tall
Kochia (ALS and Triazine Resistant)	Nightshade, Eastern black
Morningglory, entireleaf	Pigweed, redroot
Morningglory, ivyleaf	Pigweed, smooth

Precautions

When applying Spartan 4F Herbicide to coarse textured soils, it is recommended that growers allow a minimum of 7-14 days from application to planting. Some adverse crop response may occur on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.2 or higher, or on highly eroded soils, hilltops or in areas of calcareous outcroppings. Spartan 4F Herbicide use rates should be reduced to 3.0 oz/A in those areas or Spartan 4F Herbicide should not be used in those areas. Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response. As expected, poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases may also cause undesirable crop response.

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F Herbicide (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 Application Instructions, Spartan 4F Herbicide 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 Herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F Herbicide under specific local conditions.

Restrictions

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

Do not apply to frozen soils or existing snow cover to prevent Spartan 4F Herbicide runoff from rain or snowmelt that may occur following application.

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

Do not incorporate greater than 2 inches deep.

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

MINT (31.0)

Table 17

Spartan 4F Use Rate Table (Mint) For Dormant and New Planting Applications			
Broadcast Rate	Fluid Ounces Spartan 4F per acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5%	4.5 – 6.0	6.0 – 8.0	8.0
1.5 - 3.0 %	6.0 – 8.0	8.0 – 10.1	10.1
>3.0 %	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 (31.1)

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 (31.2)

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 4F Use Rate Table (Table 14) 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.

Weeds Controlled

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

Amaranth, Powell	Nutsedge, yellow
Bedstraw, catchweed	Pigweed, redroot
Chamomile, mayweed	Sheperdspurse
Kochia (ALS and Triazine Resistant)	Toadflax, yellow
Lambsquarters, common	Thistle, Russian
Morningglory, ivyleaf	Waterhemp, common
Nightshade, Eastern black	Waterhemp, tall

For information on other weeds not listed above, refer to Weed Controlled section (Table 5) 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 Application Instructions, 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 use on soils classified as sand, which have less than 1% organic matter.

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

SOD PRODUCTION (32.0)

Spartan 4F may be applied to established seeded, sodded or sprigged turfgrasses following the second mowing for the control of key grass, sedge and broadleaf weeds. Turf grasses should have developed a good root system, a uniform stand with healthy root systems to fill in the exposed edges prior to application. Sod injury could result from application of this product on sod that is not well established or has been weakened by stresses such as unfavorable weather conditions, diseases, chemical, recent harvesting or mechanical influences.

Turf Grass Tolerance

When applied as directed, the following established turf grasses are tolerant to Spartan 4F herbicide at the recommended use rates.

Table 18 Tolerant grasses

Grass Type	Maximum Use Rate Single Application	
	Fluid Ounces Spartan 4F Per Acre	Pound Active Ingredient Per Acre
Cool Season Grasses**		
Bentgrass, creeping	4	0.125
Fescue, fine * (<i>Festuca rubra</i>) Fescue, tall * (<i>Festuca arundinacea</i>) Ryegrass, perennial (<i>Lolium perenne</i>) Bluegrass, Kentucky (<i>Poa pratensis</i>) Bluegrass, Rough (<i>Poa trivialis</i>)	4-8	0.125-0.25
Warm Season Grasses**		
Bahiagrass (<i>Paspalum notatum</i>) Buffalograss (<i>Buchloe dactyloides</i>) Carpetgrass (<i>Axonopus affinis</i>) Centipedegrass (<i>Eremochloa ophiuoides</i>) Kikuyugrass (<i>Pennisetum clandestinum</i>) Seashore Paspalum (<i>Paspalum vaginatum</i>) Zoysiagrass (<i>Zoysia japonica</i>) Bermudagrass (<i>Cynadon dactylon</i>) Bermudagrass Hybrids (Cyn Bluegrass) St. Augustinegrass (<i>Stenotaphrum secundatum</i>)	8-12	0.25-0.375

* Applications of Spartan 4F to certain varieties of Chewings Fine Fescue or Tall Fescue may result in undesirable plant response.

** It is important to note that not all varieties or cultivars 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.

Applications to Reseeded, Overseeded or Sprigged Areas

Reseeding, overseeding or sprigging may be done following Spartan 4F applications to turfgrasses. If reseeding, overseeding or sprigging is done within 1 month following a Spartan 4F treatment, the establishment of desirable grasses may be inhibited. Overseeding of bermudagrass with perennial ryegrass may be done two (2) to four (4) weeks following a Spartan 4F application provided slight grass plant response can be tolerated.

Optimum reseeding and overseeding results may be obtained with the use of mechanical or power seeding equipment, and where proper soil cultivation, irrigation and fertilization practices are followed.

Adjuvant use

Good spray coverage is required for optimum control of weeds. Temporary discoloration of some sod species may result from use of surfactant. Use of surfactants is not recommended.

Postemergence Control of Sedges

Spartan 4F may be applied at the rate of four (4) to twelve (12) fluid ounces per acre to established turf grasses for the control or suppression of sedges. Select the correct Spartan 4F use rate from Table 15.

When applied as directed, Spartan 4F will provide control or suppression of the following sedges.

Table 19A

Common Name	Scientific Name
Kyllinga, green	<i>Kyllinga brevifolia</i>
Kullinga, false green	<i>Kyllinga gracillima</i>
Nutsedge, purple	<i>Cyperus rotundus</i>
Nutsedge, yellow	<i>Cyperus esculentus</i>
Sedge, cylindrical	<i>Cyperus retrorsus</i>
Sedge, globe	<i>Cyperus globulosus</i>
Sedge, Surinam	<i>Cyperus surinamensis</i>
Sedge, Texas	<i>Cyperus polystachyos</i>

Purple nutsedge: For optimum control of purple nutsedge, split applications are recommended below. Apply 4-8 ounces per acre as an initial application followed by a second application when evidence of actively growing purple nutsedge is visible. Do not exceed the maximum rate per acre based on the turf variety as listed in Table 15; tolerant grasses.

Split Application Rates for Optimum Purple Nutsedge Control

Grass Type	First Application (fl. ozs. per acre)	Second Application (fl. ozs. per acre)
Cool Season Grasses	2-4 fl. ounces	2-6 fl. ounces
Warm Season Grasses	4-6 fl. ounces	4-6 fl. ounces

Allow 35 days after first application for second application.

Postemergence Control of Grassy Weeds

Spartan 4F will control or suppress specific annual grasses (Table 22 B) when applied at a rate of 4 to 12 fl oz/acre . Apply the highest rate consistent with the rate needed for turfgrass tolerance in Table 21. Rates lower than 12 fl oz/acre will generally control grasses for at least 60 days. Spartan 4F works best if applied when the annual grasses are small (pre tiller stage) and actively growing.

Table 19B

Common Name	Scientific Name
Goosegrass	<i>Eleusine indica</i>

Postemergence Control of Broadleaf Weeds

Spartan 4F herbicide will control or suppress the weeds listed in the broadleaf chart below when applied alone shortly after weeds have emerged. Spartan 4F may be applied at the rate of four (4) to twelve (12) fluid ounces per acre to established turf grasses for the control or suppression of broadleaf weeds. Select the correct Spartan 4F use rate from Table 17. For optimum results, Spartan 4F applications should be made shortly after weeds have emerged.

Spartan 4F may be tankmixed with other herbicides, insecticides and fungicides registered for use on turfgrasses. Read and follow the label recommendations of the tank mix partner to determine turfgrass specie tolerance, use rates and application requirements. Follow all label restrictions, use directions and precautionary statements before use.

When applied as directed, Spartan 4F will provide control or suppression of the following broadleaf weeds.

Table 20

Broadleaves	Scientific Name	Broadleaves	Scientific Name
Bittercress	<i>Cardamine spp.</i>	Mallow, common	<i>Malva neglecta</i>
Black Medic	<i>Medicago lupulina</i>	Onion, wild	<i>Allium canadense</i>
Buttercup	<i>Ranunculus spp.</i>	Parsley piert	<i>Alchemilla arvensis</i>
Carolina geranium	<i>Geranium carolinianum</i>	Pigweed, redroot	<i>Amaranthus retroflexus</i>
Carpetweed	<i>Mollugo verticillata</i>	Pigweed, tumble	<i>Amaranthus albus</i>
Chickweed, common	<i>Stellaria media</i>	Pineapple weed	<i>Matricaria matricariodes</i>
Chickweed, mousear	<i>Cerastium vulgatum</i>	Plantain, buckhorn	<i>Plantago lanceolata</i>
Cinquefoil	<i>Potentilla spp.</i>	Puncture weed	<i>Tribulus terrestris</i>
Clover	<i>Trifolium spp.</i>	Purslane, common	<i>Portulaca oleracea</i>
Cudweed	<i>Gnaphalium spp.</i>	Pusley, Florida	<i>Richardia scabra</i>
Dandelion	<i>Taraxacum officinale</i>	Redweed	<i>Melochia corchorifolia</i>
Dock, curly	<i>Rumex crispus</i>	Rocket, London	<i>Sisymbrium irio</i>
Evening primrose	<i>Oenothera biennis</i>	Smartweed, PA	<i>Polygonum pennsylvanicum</i>
Fiddleneck	<i>Amsinckia spp.</i>	Sorrel, red	<i>Rumex acetosella</i>
Filaree	<i>Erodium spp.</i>	Speedwell	<i>Veronica spp.</i>
Garlic, wild	<i>Allium vineale</i>	Spurge, annual	<i>Euphorbia spp.</i>
Goldenrod	<i>Solidago spp.</i>	Spurge, prostrate	<i>Euphorbia humistrata</i>
Ground ivy	<i>Glechema hederasea</i>	Spurge, spotted	<i>Euphorbia maculata</i>
Henbit	<i>Lamium amplexicaule</i>	Star of Bethlehem	<i>Omithogalum umbellatum</i>
Knotweed, prostrate	<i>Polygonum aviculare</i>	Velvetleaf	<i>Abutilon theophrasti</i>
Kochia	<i>Kochia scoparia</i>	Violet, wild	<i>Viola pratincola</i>
Lambsquarters, common	<i>Chenopodium album</i>	Woodsorrel, creeping	<i>Oxalis corniculata</i>
Lawn burweed	<i>Soliva pterosperma</i>	Woodsorrel, yellow	<i>Oxalis stricta</i>
Lespedeza, common	<i>Lespedeza striata</i>		

Precautions

The use of additional surfactants may cause temporary undesirable effects to turfgrasses.

Restrictions

Sod production areas must be established three (3) months prior to the initial treatment of Spartan 4F.

Do not apply Spartan 4F to golf course greens or tees.

Do not apply Spartan 4F to turf grasses not listed on this label.

Do not apply with surfactants without on-site evaluations for spray mixture compatibility and physical effects to turf grasses.

Do not graze or feed forage harvested from Spartan 4F treated areas.

Do not apply to landscape ornamental plants or ornamental beds.

Do not harvest sod within three (3) months of Spartan 4F application.

PERMANENT CROPS (33.0)

Blueberry, Bushberry, Caneberry, Grapes (Wine, Raisin, Table and Juice), Lemon and Orange

Pistachio and Walnut (Black and English)

APPLICATION INFORMATION

Spartan 4F Herbicide should be applied as a uniform broadcast soil application to orchard and vineyard floors or as a uniform band application directed to the base of the trunk in trees and vines to provide preemergence control of weeds in the Permanent Crop Weed List.

For best control, Spartan 4F Herbicide should be applied when there are no weeds present. If weeds are present, tank mix with a postemergence herbicide to eliminate emerged weeds.

For broadcast applications, a single application of Spartan 4F Herbicide should be made at 8-12 fl oz per acre (0.25-0.375 lb ai/A). Do not apply more than 12 fluid ounces (0.375 lb ai) per acre per twelve-month period. The twelve-month period is considered to begin when the initial application of Spartan 4F Herbicide is applied.

For improved weed management, Spartan 4F Herbicide can be applied in a tank mixture with other preemergence and postemergence burndown herbicides. Refer to the tank mix partner's labels for additional restrictions, including minimum spray volumes and crops in which they are labeled. Burndown herbicides may include, but are not limited to, Aim, glyphosate, paraquat, glufosinate, and 2,4-D. Do not tank mix with Chateau® herbicides (flumioxazin) or with other products containing sulfentrazone.

When applied as a banded treatment (50% band or less), refer to formula in chart below for rate and volume. Spartan 4F Herbicide may be applied twice per year. Do not apply more than 12 fl oz product per acre (0.375 lb ai/A) on a broadcast application basis per year. Allow a minimum of 60 days between applications, unless otherwise specified on the label or separate published FMC recommendations.

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

<u>Band Width Feet</u>	X	Broadcast	=	Band Rate
Row Width Feet		Rate Per Acre		
Band Width Feet	X	Broadcast Volume	=	Band Volume
		Per Acre		

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

Spartan 4F Herbicide should only be applied to crops that have been established for 3 growing seasons and are in good health and vigor. Avoid contact of the spray solution on the green bark of trunks of young vines and trees by wrapping the trunk with a nonporous wrap, grow tubes, or wax containers which will keep the spray solution from coming in direct contact with the green tissue. Avoid direct or indirect spray contact with crop foliage and fruit.

Use ground equipment only. Do not apply using an airblast sprayer or by air. Do not apply using a mechanically pressurized handgun.

Best results are obtained when the soil is moist at the time of application and the application will be followed by at least ½ inch of rainfall or sprinkler irrigation within two weeks after application. Applications should be timed to take advantage of normal rainfall patterns and cool temperatures, especially where drip or micro sprinkler irrigation is used which may not uniformly incorporate the herbicide.

WEED CONTROL INFORMATION

Spartan 4F Herbicide is a selective soil-applied herbicide for the control of susceptible broadleaf, grass and sedge weeds listed in this section. Adequate moisture of at least ½ inch is required within 14 days after application for optimal control. If adequate rainfall is not received in a timely fashion, irrigate with a minimum of ½ inch of water. When activating moisture is delayed, a reduced level of weed control may occur. These escaped weeds can be removed using a burndown herbicide.

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

Residual weed control may be reduced when Spartan 4F Herbicide is applied where heavy crop trash such as leaves and branches and /or weed residues exists. It is best to rake or blow off the leaves and trash when they fall and prior to the Spartan 4F Herbicide application.

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

Permanent Crop Weed List

Common Name	Scientific Name
Amaranth, livid	<i>Amaranthus lividus</i>
Amaranth, Palmer	<i>Amaranthus palmeri</i>
Amaranth, Powell	<i>Amaranthus Powell II</i>
Amaranth, spiny	<i>Amaranthus spinosus</i>
Amaranth, spleen	<i>Amaranthus dubius</i>
Anoda, spurred	<i>Anoda cristata</i>
Barnyardgrass, common	<i>Echinochloa crus-galli</i>
Bedstraw, catchweed	<i>Galium aparine</i>
Bindweed, field	<i>Convolvulus arvensis</i>
Bluegrass, annual	<i>Poa annua</i>
Brome grass species	<i>Bromus spp.</i>
Burclover, California	<i>Medicago polymorpha</i>
Carpetweed	<i>Mollugo verticillata</i>
Cheatgrass	<i>Bromus tectorum</i>
Cheeseweed species	<i>Malva spp.</i>
Chickweed, common	<i>Stellaria media</i>
Clover species	<i>Trifolium spp.</i>
Copperleaf, hophornbeam	<i>Acalypha ostryeafolia</i>
Copperleaf, Virginia	<i>Acalypha virginica</i>
Crabgrass, large	<i>Digitaria sanguinalis</i>
Crabgrass, smooth	<i>Digitaria ischaemum</i>
Crabgrass, Southern	<i>Digitaria ciliaris</i>
Croton, tropic	<i>Croton glandulosus</i>
Crownbeard, golden	<i>Verbesina encelioides</i>
Cupgrass, woolly	<i>Erichloa villosa</i>
Cyperus, hedgehog	<i>Cyperus compressus</i>
Daisy, American	<i>Eclipta alba</i>
Devilsclaw	<i>Proboscidea louisiana</i>
Dock, curly	<i>Rumex crispus</i>
Eclipta	<i>Eclipta prostrata</i>
Eveningprimrose, cutleaf	<i>Oenothera laciniata</i>
Fescue, Red	<i>Fetuca rubra</i>
Fiddleneck species	<i>Amsinckia spp.</i>
Filaree, broadleaf	<i>Erodium botrys</i>
Filaree, redstem	<i>Erodium cicutarium</i>
Filaree, whitestem	<i>Erodium moschatum</i>
Fleabane, hairy	<i>Conyza bonariensis</i>
Flixweed	<i>Descurainia sophia</i>
Foxtail, bristly	<i>Setari verticillata</i>
Foxtail, giant	<i>Setaria faberi</i>
Foxtail, green	<i>Setaria viridis</i>
Foxtail, yellow	<i>Setaria glauca</i>
Galinsoga, hairy	<i>Galinsoga ciliata</i>
Goosegrass	<i>Eleusine indica</i>
Goosefoot, nettleleaf	<i>Chenopodium murale</i>
Groundcherry, clammy (seedling)	<i>Physalis heterophylla</i>
Groundcherry, cutleaf	<i>Physalis angulata</i>
Groundsel, common	<i>Senecio vulgaris</i>
Henbit	<i>Lamium amplexicaule</i>
Ryegrass, Italian	<i>Lolium multiflorum</i>
Jimsonweed	<i>Datura stramonium</i>
Johnsongrass	<i>Sorghum halpense</i>
Junglerice	<i>Echinochloa colona</i>
Knotweed, common	<i>Polygonum arenastrum</i>

Common Name	Scientific Name
Kochia (ALS and Triazine Resistant)	<i>Kochia scoparia</i>
Ladysthumb	<i>Polygonum persicaria</i>
Lambsquarters, common	<i>Chenopodium album</i>
Lettuce, miners	<i>Montia perfoliata</i>
Lovegrass species	<i>Eragrostis spp.</i>
Mallow, common	<i>Malva neglecta wall r.</i>
Mallow, little	<i>Malva parviflora</i>
Mayweed, Chamomile	<i>Anthemis cotula l.</i>
Milkweed, honeyvine	<i>Ampelamus albidus</i>
Morningglory, entireleaf	<i>Ipomoea hederacea integruscula</i>
Morningglory, ivyleaf	<i>Ipomoea hederacea hederacea</i>
Morningglory, palmleaf	<i>Ipomoea wrightii</i>
Morningglory, purple	<i>Ipomoea turbinata</i>
Morningglory, red	<i>Ipomoea, coccinea L.</i>
Morningglory, scarlet	<i>Ipomoea coccinea</i>
Morningglory, smallflower	<i>Jacquemontia tamnifolia</i>
Morningglory, tall	<i>Ipomoea, purpurea</i>
Mullein, turkey	<i>Eremocarpus setigerus</i>
Mustard, Species	<i>Brassica spp.</i>
Mustard, tumble	<i>Sisymbrium altissimum</i>
Nettle, burning	<i>Urtica urens</i>
Nightshade, black	<i>Solanum nigrum</i>
Nightshade, Eastern black	<i>Solanum ptycanthum</i>
Nutsedge, purple	<i>Cyperus rotundus</i>
Nutsedge, yellow	<i>Cyperus esculentus</i>
Orchardgrass	<i>Dactylis glomerata</i>
Panicum, fall	<i>Panicum dichotomiflorum</i>
Pigweed, prostrate	<i>Amaranthus blitoides</i>
Pigweed, redroot	<i>Amaranthus retroflexus</i>
Pigweed, smooth	<i>Amaranthus hybridus</i>
Pigweed, Tumble	<i>Amaranthus albus</i>
Pineapple-weed	<i>Chamomilla suaveolens</i>
Plantain, blackseed	<i>Plantago rugelii decne</i>
Plantain, narrow-leaved	<i>Plantago lanceolata</i>
Poorjoe	<i>Diodia teres</i>
Porophyllum	<i>Porophyllum rederule</i>
Poinsettia, wild	<i>Euphorbia heterophylla</i>
Puncturevine	<i>Tribulus terrestris</i>
Purslane, common	<i>Portulaca oleracea</i>
Redmaids	<i>Calandrinia ciliata</i>
Redweed	<i>Melochia corchorifolia</i>
Radish, Wild	<i>Raphanus raphanistrum</i>
Rocket, London	<i>Sisymbrium irio</i>
Sandbur	<i>Cenchrus spinifer</i>
Sedge, annual	<i>Carex spp.</i>
Senna, coffee	<i>Cassia occidentalis</i>
Sheperdspurse	<i>Capsella bursa-pastoris</i>
Sida, prickly	<i>Sida spinosa</i>
Sida, Southern	<i>Sida acuta</i>
Signalgrass, broadleaf	<i>Brachiaria platyphylla</i>
Smartweed, PA (seedling)	<i>Polygonum pensylvanicum</i>
Smellmellon	<i>Cucumis melo</i>
Sowthistle species	<i>Sonchus spp.</i>

Permanent Crop Weed List (continued)

Common Name	Scientific Name
Sprangletop, red	<i>Leptochloa filiformis</i>
Spurge, spotted	<i>Chamaesyce maculate</i>
Starbur, bristly	<i>Acanthospermum hispidum</i>
Stinkgrass	<i>Eragrostis cilianensis</i>
Toadflax, yellow	<i>Linaria vulgaris</i>
Tassleflower, red	<i>Emilio sonchifolia</i>
Thistle, Russian	<i>Salsola kali</i>
Waterhemp, common	<i>Amaranthus rudis</i>
Waterhemp, tall	<i>Amaranthus tuberculatos</i>
Waterprimrose, winged	<i>Ludwigia decurrens</i>
Willowleaf, panicle-leaf	<i>Epilobium brachycarpum</i>
Witchgrass	<i>Panicum capillare</i>

ANNUAL AND PERENNIAL SEDGE CONTROL INCLUDING NUTSEGE

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

When applied as directed, Spartan 4F Herbicide will provide control or suppression of the following sedges.

Common Name	Scientific Name
Kyllinga, green	<i>Kyllinga brevifolia</i>
Kyllinga, false green	<i>Kyllinga gracillima</i>
Nutsedge, purple	<i>Cyperus rotundus</i>
Nutsedge, yellow	<i>Cyperus esculentus</i>
Sedge, cylindrical	<i>Cyperus retrorsus</i>
Sedge, globe	<i>Cyperus globulosus</i>
Sedge, Surinam	<i>Cyperus surinamensis</i>
Sedge, Texas	<i>Cyperus polystachyos</i>

Optimum control of purple nutsedge may be obtained using split applications of Spartan 4F Herbicide. Apply 4-6 fluid ounces per acre followed by a second application to actively growing purple nutsedge. Do not exceed the maximum rate of 12 fluid ounces (0.375 lb ai/A) per season. Spartan 4F Herbicide symptoms on purple nutsedge will be observed as reduced nutsedge stands, necrosis, chlorosis, and/or stunting. Optimum control may not be observed until the second year after the original treatment.

REPLANTING IN NEW OR ESTABLISHED ORCHARDS AND VINEYARDS

Delay replanting at least 30 days after Spartan 4F Herbicide applications when replacing trees and vines in newly planted and established orchards and vineyards. Use untreated soil when replanting trees and vines.

Precautions

These Crop Specific Use directions are based upon the interactive effects of Spartan 4F Herbicide (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 Product Application Instructions, General Spartan 4F Herbicide 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 Herbicide. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Spartan 4F Herbicide under specific local conditions. FMC does not recommend tank mixing this product with other products containing sulfentrazone or other group 14 herbicides as crop injury may occur.

Restrictions

- Do not use on almonds.
- Use ground equipment only. Do not apply Spartan 4F Herbicide using airblast sprayers or by air. Do not apply using a mechanically pressurized handgun.
- Do not apply more than 12 fluid oz product per acre (0.375 lb ai/A) per season.
- Apply to crops that have been growing for at least 3 years and are in good condition.
- Avoid direct or indirect spray contact to foliage and green bark (wrap trunk with non-porous wrap, grow tubes, or wax containers to keep spray solution off of green tissue).
- Do not apply to powdery soils or soils where wind may displace the soil, unless irrigation can be applied immediately after application.
- Follow the most restrictive label of tank mix partners including all references to potential carryover and crop injury warnings and restrictions.
- Pre-harvest Interval (PHI): 3 days
- If two banded treatments are made in a growing season, allow a minimum of 60 days between applications; however, do not exceed the seasonal maximum use rate.

LABEL TRACKING INFORMATION (34.0)

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