

# SUNFLOWER

## General Information

## PRODUCT INFORMATION

### FOR USE ON:

Alfalfa, Asparagus, Bean (dry) and Pea (shelled), Bean and Pea (succulent shelled), Broccoli, Cabbage, Canola\*, Carrot, Cauliflower (and other Head and Stem Brassica Vegetables), Celery, Clover (grown in Idaho, Oregon and Washington only), Conifers, Cotton, Cranberry, Cucumber, Eggplant (and other Fruiting Vegetables), Fallow Land and other non-producing agricultural areas, Flax\*, Garden Beet, Garlic, Herbs, Hops, Horseradish (and other Root Vegetables), Legume Vegetables (edible podded), Lettuce, Head and Leaf (and other leafy greens), Melons (including Cantaloupes and Watermelons), Mint, Mustard Greens (and other leafy brassica greens), Mustard Seed\*, Non-Bearing Food Crops, Non-Crop or Non-Planted Areas, Onions (dry bulb and green), Ornamentals, Peanut (including perennial), Peppers (bell and non-bell), Potato, Radish, Rhubarb (and other Leaf Petioles), Safflower, Sesame, Shallots (dry bulbs and green), Squash (including Pumpkins), Soybeans, Strawberry, Sugar Beet, Sunflower, Sweet Potato, Tomato and Yam (and other Tuberous and Corm Vegetables)

\* Not for use in California

### NOTES:

1. Other Bean (dry) and Pea (shelled) crops approved for use with CLETHODIM 2 EC include: Bean (*Lupinus* spp.), grain, sweet, white and white sweet; Bean (*Phaseolus* spp.), field, kidney, lima (dry), navy, pinto and tepary; Bean (*Vigna* spp.), adzuki bean, black-eyed pea, catjang, cowpea, crowder pea, moth bean, mung bean, rice bean, Southern pea, urd bean, broad (dry), chickpea (garbanzo), guar, lablab bean and lentil; Pea (*Pisum* spp.), field and pigeon
2. Other Bean and Pea (succulent shelled) crops approved for use with CLETHODIM 2 EC include: Bean (*Lupinus* spp.), grain, sweet, white and white sweet; Bean (*Phaseolus* spp.), field, kidney, lima (dry), navy, pinto and tepary; Bean (*Vigna* spp.), adzuki bean, black-eyed pea, catjang, cowpea, crowder pea, moth bean, mung bean, rice bean, Southern pea, urd bean, broad (dry), chickpea (garbanzo), guar, lablab bean and lentil; Pea (*Pisum* spp.), field and pigeon

3. Other Head and Stem Brassica Vegetables approved for use with CLETHODIM 2 EC include: Chinese broccoli, Brussels sprouts, Chinese (napa) cabbage, Chinese mustard, cavalo broccolo and kohlrabi

4. Other Fruiting Vegetables (except tomato) approved for use with CLETHODIM 2 EC include: eggplant, groundcherry, pepino, peppers (all) and tomatillo

5. Other Herb crops approved for use with CLETHODIM 2 EC include: angelica, balm, basil, borage, burnet, camomile, catnip, chervil (dried), chive, Chinese chive, clary, coriander (leaf), costmary, culantro (leaf), curry (leaf), dill (dillweed), horehound, hyssop, lavender, lovage (leaf), marigold, marjoram (*Origanum* spp.), nasturtium, parsley (dried), pennyroyal, rosemary, rue, sage and savory, summer and winter

6. Other Root Vegetables approved for use with CLETHODIM 2 EC include: burdock, edible; celeriac; chervil, turnip-rooted; chicory; ginseng; parsley, turnip-rooted; parsnip; radish, oriental; rutabaga; salsify; salsify, black; salsify, Spanish; skirret and turnip

7. Other Edible Podded Legume Vegetable crops approved for use with CLETHODIM 2 EC include: Bean (*Phaseolus* spp.), runner, snap and wax; Bean (*Vigna* spp.), asparagus, Chinese longbean, moth, yardlong, jackbean; Pea (*Pisum* spp.), dwarf, edible-pod, snow, sugar snap, pigeon and sword bean

8. Other Leafy Greens crops approved for use with CLETHODIM 2 EC include: amaranth (Chinese spinach, leafy amaranth and tampala), arugula (roquette), chervil, chrysanthemum (edible-leaved and garland), corn salad, cress (garden, yellow rock and winter), dandelion, dock (sorrel), endive (escarole), lettuce (head and leaf), orach, parsley, purslane (garden and winter), radicchio (red chicory), spinach (New Zealand and Vine (Indian and Malabar))

9. Other cucurbit crops approved for use with CLETHODIM 2 EC include: Chayote (fruit), Chinese Wax Gourd, Citron Melon, Edible Gourd, Gherkin and Muskmelons (all) including Honeydew Melon

10. Other leafy brassica greens approved for use with CLETHODIM 2 EC include: broccoli raab, Chinese (bok choy) cabbage, collards, kale, mizuna, mustard greens, mustard spinach, rape greens, and turnip greens

11. Other Leaf Petiole crops approved for use with CLETHODIM 2 EC include: cardoon, celtuce, Chinese celery, Florence fennel, and Swiss chard

12. Other Tuber and Corm Vegetables approved for use with CLETHODIM 2 EC include: arracacha, arrowroot, Chinese artichoke, Jerusalem artichoke, edible burdock, edible canna, bitter and sweet cassava, chayote (root), chufa, dasheen (taro), ginger, leren, tanier, turmeric, and bean yam

CLETHODIM 2 EC is not intended for use on vegetable crops being grown for seed production unless specific use directions are provided.

CLETHODIM 2 EC is a selective postemergence herbicide for control of annual and perennial grasses. CLETHODIM 2 EC does not control sedges or broadleaf weeds. Repeated use of CLETHODIM 2 EC (or similar postemergence grass herbicides with the same mode of action) may lead to the selection of naturally occurring biotypes that are resistant to these products in some grass species.

If poor performance occurs and cannot be attributed to adverse weather or application conditions, a resistant biotype may be present. This is most likely to occur in fields where other control strategies such as crop rotation, mechanical removal, and other classes of herbicides are not used from year to year.

Do not allow CLETHODIM 2 EC to come in contact with desirable grass crops such as corn, rice, sorghum, small grains, or turf, as these and other grass crops will be injured or killed. Minor leaf spotting may occur on treated plants under certain environmental conditions. New foliage is not affected.

### Control Symptoms

Treated grass weeds show a reduction in vigor and growth. Early chlorosis/necrosis of younger plant tissue is followed by a progressive collapse of the remaining foliage. Symptoms will generally be observed in 7 to 14 days after application, depending on grass species treated and environmental conditions.

## APPLICATION INFORMATION

### Timing of Applications

Apply CLETHODIM 2 EC postemergence to actively growing grasses according to rate table use directions. Applications made to grass plants stressed by insufficient moisture, or hot or cold temperatures, or to grass plants exceeding labelled growth stages may result in unsatisfactory control. Do not apply under these conditions.

In arid regions where irrigation is used to supplement limited rainfall, CLETHODIM 2 EC should be applied as soon as possible, after irrigation (within 7 days). In arid regions, a second application of CLETHODIM 2 EC will generally provide more effective control of perennial grass weeds than a single application. Make second

application to actively growing grass 2 to 3 weeks after emergence of new growth.

Cultivation of treated grasses 7 days prior to or within 7 days after application of CLETHODIM 2 EC may reduce weed control. DO NOT APPLY CLETHODIM 2 EC if rainfall is expected within one hour, since control may be reduced.

#### ADDITION OF ADJUVANT OR CROP OIL CONCENTRATE

##### CROP:

Alfalfa, Cotton, Bean (dry) & Pea (shelled), Edible Podded Legume Vegetables, Peanuts (including perennial), Potato, Soybean, Bean & Pea (succulent shelled), Sugar Beet and Sunflower

##### ADJUVANT:

Always use a crop oil concentrate\* at 1.0 qt./A by ground or 1% v/v (but not less than 1 pt./A) in the finished spray volume by air. 1 to 2 qts./A of liquid fertilizer (10-34-0, 28%N or 32%N), or an equivalent amount (2.5 to 4.0 lbs./A) of spray-grade ammonium sulfate (AMS) may be added to CLETHODIM 2 EC applications, in addition to the labelled rate of crop oil concentrate. The addition of AMS has shown improved grass control for difficult to control species including: quackgrass, rhizome Johnsongrass, red rice, wild oats, volunteer cereals, and volunteer corn.

##### CROP:

Asparagus, Canola, Carrot, Clover, Cranberry, Cucurbits, Flax, Fruiting Vegetables (except Tomato), Garden Beet, Garlic, Head & Stem Brassica Vegetables, Herbs, Hops, Leaf Petioles, Leafy Brassica Greens, Leafy Greens, Mint, Mustard Seed, Onion (Dry Bulb & Green), Root Vegetables, Safflower, Sesame, Shallots (Dry Bulb & Green), Strawberry, Sweet Potato (Yam & other Tuberous and Corm Vegetables except Potato) and Tomato

##### ADJUVANT:

Always use a crop oil concentrate at 1% v/v in the finished spray volume unless tank mix instructions indicate otherwise. Do not use liquid fertilizer with clethodim for these crops.

##### CROP:

Non-Bearing Food Crops, Ornamental Plants

##### ADJUVANT:

Add a non-ionic surfactant containing at least 80% active ingredient at the rate of 1 pt. per 50 gals. (0.25% v/v). Do not use crop oil concentrate since it may injure

flowers and foliage.

**CROP:**

Conifer Trees, Fallow Land (and other nonproducing agricultural areas), and Non-Crop or Non-planted Areas

**ADJUVANT:**

Always use a crop oil concentrate containing at least 15% emulsifier at 1% v/v (but not less than 1 pt./A) in the finished spray volume.

\* Acceptable crop oil concentrates would be those that contain a minimum of 80% oils and 15% emulsifier. A crop oil concentrate must contain either a petroleum or vegetable oil base and must meet all the following criteria: be non phytotoxic, contain only EPA-exempt ingredients, provide good mixing quality, and be successful in local experience. Highly refined vegetable oils have proven more satisfactory than unrefined vegetable oils.

**Ground Application**

Use of sufficient spray volumes and pressure is essential to ensure complete coverage. Use a minimum of 5 gals. and a maximum of 40 gals. of spray solution per acre. Under the following conditions a minimum of 10 gals. per acre is required: ultra narrow row cotton, narrow row soybeans, broadleaf herbicide tank mixes, perennial grasses, volunteer corn, drought or stress conditions, heavy grass pressure or when grasses are at or near maximum height. Failure to use a minimum of 10 gals. per acre under these conditions can result in poor coverage and reduced grass control requiring repeat applications. Spray pressures should reflect a minimum of 30 psi and a maximum of 60 psi at the nozzle. Do not use flood nozzles. Applications to onions (dry bulbs and green), garlic, and shallots (dry bulbs and green) should be made in a minimum of 20 gals. of spray solution per acre.

**Air Application**

Use a minimum of 3 gals. of spray solution per acre unless otherwise directed in the label. Increase spray volumes up to 10 gals. as grass or crop foliage becomes dense. For onions (dry bulbs and green), garlic, or shallots (dry bulbs and green): When applying by air do not exceed 8 fl. oz./A in a single application. In California, air applications to onions, garlic or shallots should be made in a minimum of 20 gals. of spray solution per acre. In states other than California, air application to onions, garlic, or shallots should be made in a minimum of 10 gals. of spray solution

per acre.

NOTE: Crop injury may occur when CLETHODIM 2 EC is applied to onions, garlic or shallots with aerial equipment.

### Spot Treatment

When using hand sprayers or high volume sprayers utilizing hand guns, mix 1/4% to 1/2% (0.33 oz. to 0.65 oz. per gal.) CLETHODIM 2 EC and treat to wet vegetation, while not allowing runoff of spray solution. For uses requiring crop oil concentrate, include crop oil concentrate at 1% (1.3 oz. per gal.) by volume. For uses requiring non-ionic surfactant, include non-ionic surfactant at 1/4% (0.33 oz. per gal.) by volume.

NOTE: If CLETHODIM 2 EC is applied as a spot treatment, care should be taken to not exceed the maximum rate allowed on a "per acre" basis or crop injury may occur.

CHEMIGATION- ONION (Dry Bulb and Green) AND GARLIC SPRINKLER IRRIGATION APPLICATION Do not apply CLETHODIM 2 EC by chemigation in the states of Idaho, Montana, Oregon and Washington.

Apply CLETHODIM 2 EC at the high rate for annual grasses (16 fl. oz. per acre) when the grass height is at the low end of the range (application to larger grasses may not provide adequate control). Add a crop oil concentrate containing at least 15% emulsifier at 1 quart per acre.

Apply CLETHODIM 2 EC in 0.1 to 0.2 acre-inch of water either at the end of a regular irrigation set or as a separate application not associated with a regular irrigation using the least amount of water that provides proper distribution and coverage. Application of more than labelled quantities of irrigation water per acre may result in decreased product performance by removing the chemical from the zone of effectiveness. Use a metering device to inject the CLETHODIM 2 EC into the irrigation water at a constant flow.

Constant agitation must be maintained in the chemical supply tank during the entire period of herbicide application. Inject the product with a positive displacement pump into the main line ahead of a right angle turn to ensure adequate mixing. Allow time for all lines to flush the herbicide through all nozzles

before turning off irrigation water. To ensure the lines are flushed and free of remaining herbicide, a dye indicator may be injected into the lines to mark the end of the application period.

Do not apply CLETHODIM 2 EC through an irrigation system 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 out of the year.

#### Use Precautions

1. Apply this product only through sprinkler irrigation systems including center pivot, lateral move, end tow, side (wheel) roll, travelers, big gun, solid set, or hand move. Do not apply this product through any other type of irrigation system.
2. Crop injury, lack of effectiveness, or illegal pesticide residues in the crop may result from non-uniform distribution of treated water.
3. If you have any questions about calibration, you should contact State Extension Service specialists, equipment manufacturers or other experts.
4. Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the label-prescribed safety devices for public water supplies are in place.
5. A person knowledgeable of the chemigation system and responsible for its operation or under supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.
6. 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.
7. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
8. 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.
9. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
10. 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.

11. 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.

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

## RESTRICTIONS AND LIMITATIONS

### FOR ALL USES

Do not apply if rain is expected within 1 hour of application as control may be unsatisfactory.

Do not apply a postemergence broadleaf herbicide within one day following application of CLETHODIM 2 EC or reduced grass control may result.

Do not use CLETHODIM 2 EC on vegetable crops being grown for seed production unless specific use directions are provided.

For canola, do not apply more than 6 fl. oz. of CLETHODIM 2 EC per acre per season. For clover, flax, mustard seed and radish crops, do not apply more than 16 fl. oz. of CLETHODIM 2 EC (0.25 lb. ai) per acre per season. For all other crops, do not apply more than 32 fl. oz. of CLETHODIM 2 EC (0.50 lb. ai) per acre per season. Application on Long Island, New York, is restricted to no more than 16 fl. oz. of CLETHODIM 2 EC (0.25 lb. ai) per acre per season.

Do not apply more than 8 fl. oz./A of CLETHODIM 2 EC per application to the following crops: asparagus, brassica vegetables (head and stem), bean (succulent shelled), carrot, cranberry, cucurbits, flax, fruiting vegetables (except tomato), garden beet, green onion, herbs, hops, leaf petioles, leafy brassica greens, leafy greens, legume vegetables (edible podded), non-bearing food crops, pea (shelled), pea (succulent shelled), root vegetables, safflower, sesame and strawberry. Do not apply more than 6 fl. oz./A of 2 EC per application to canola or mustard seed. For all other crops, do not apply more than 16 fl. oz. of CLETHODIM 2 EC (0.25 lb. ai) per acre per application.



Exceeding these label rates may result in unacceptable crop injury or the crops thereof rendered unfit for sale, use or consumption.

Do not apply under conditions of stress. Applying CLETHODIM 2 EC under conditions that do not promote active grass growth will reduce herbicide effectiveness. These conditions include drought, excessive water, extremes in temperature, low humidity and grasses either partially controlled or stunted from prior pesticide applications. Grasses under these kinds of stressful conditions will not absorb and translocate CLETHODIM 2 EC effectively, and will be less susceptible to herbicide activity.

Optimal perennial grass control can be obtained if rhizomes or stolons are cut up by preplant tillage practices, (discing, plowing, etc.) to stimulate maximum emergence of grass shoots. Cultural practices, such as continuous no-tillage in which the perennial grass rhizomes or stolons are not cut up, result in a very staggered, non-uniform weed emergence. Due to this non-uniform weed emergence, do not use fewer than 2 CLETHODIM 2 EC applications per year at the appropriate weed-growth stage rate under continuous no-till conditions ; however, do not exceed the maximum yearly application rates listed on the label.

Grass crops such as corn, rice, sorghum, small grains, or turf, etc. are highly sensitive to CLETHODIM 2 EC. While all the vegetable crops on the label have been tested and are tolerant to CLETHODIM 2 EC, not all specialty varieties of these crops have been tested. It is advised that, before applying CLETHODIM 2 EC to specialty varieties of vegetable crops on the label, crop tolerance be investigated first using a small section of the field. It is possible that injury symptoms can occur. Symptoms may appear as leaf speckling or stunting.

Always read and follow the restrictions and limitations for all products whether used alone or in a tank mix. The most restrictive labeling of any product used applies in tank mixtures, including all crop rotational and other crop restrictions.

Tank mixes of CLETHODIM 2 EC and broadleaf herbicides may result in reduced grass control. If grass regrowth occurs, an additional application of CLETHODIM 2 EC may be necessary. AVOID SPRAY DRIFT.

Do not allow spray from ground or aerial equipment to drift onto adjacent land or crops. When drift may be a problem, do everything possible to reduce spray drift, including:

- Do not spray if wind speed is 10 mph or greater. If sensitive crops or plants are downwind, extreme caution must be used under all conditions.
- Do not spray if winds are gusty.
- Use extreme caution when conditions are favorable for drift (high temperatures, drought, low relative humidity), especially when sensitive plants are located nearby.
- Do not apply when a temperature inversion exists. If inversion conditions are suspected, consult with local weather services before making an application.
- Further reductions in drift can be obtained by:
  1. Using large droplet size sprays. Do not use nozzles that produce small droplets. Orient nozzles downward and slightly backward as needed to reduce drift for ground applications.
  2. Orienting nozzles straight back with the windstream, using straight stream orifices for aerial applications. Use the lowest number of nozzles practical with the largest possible orifice size to obtain the minimum 3 GPA volume. Application height and boom length should be set according to manufacturer's instructions to minimize drift.
  3. Increasing the volume of spray mixture (for example, a minimum of 10 GPA for ground applications) by using higher flow rate nozzles. Using lower pressure with the appropriate nozzle to obtain higher volumes will also reduce drift.
  4. Applying as close to target plants as practical while maintaining a good spray pattern for adequate coverage.

Do not apply under conditions involving possible drift to food, forage or other plantings that might be damaged or the crops thereof rendered unfit for sale, use or consumption.

#### Limitations, Restrictions, and Exceptions

#### SUNFLOWER

Crop Oil Concentrate per Acre: 1 qt. by ground or 1% v/v, but not less than 1 pt./A by air.

### Specific Use Instructions:

The addition of AMS has shown improved grass control for difficult to control species including: quackgrass, rhizome Johnsongrass, red rice, wild oats, volunteer cereals, and volunteer corn.

### Notes:

- Acceptable crop oil concentrates would be those which contain a minimum of 80% oils and 15% emulsifier. A crop oil concentrate must contain either a petroleum or vegetable oil base and must meet all the following criteria: be non phytotoxic, contain only EPA-exempt ingredients, provide good mixing quality and be successful in local experience. Highly refined vegetable oils have proven more satisfactory than unrefined vegetable oils. See the Additional Adjuvant and Crop Oil Concentrate section for further information.
- 1 to 2 qts./A of liquid fertilizer (10-34-0, 28%N or 32%N), or an equivalent amount (2.5 to 4.0 lbs./A) of spray grade ammonium sulfate (AMS) may be added to CLETHODIM 2 EC applications, in addition to the labelled rate of crop oil concentrate.

### ANNUAL WEEDS

Weed Height: Generally occurs between 3-leaf stage and tillering.

### NOTES:

1. Rates higher than 8 fl. oz./A may be applied in certain geographic areas, cropping situations, or environmental conditions, where experience has shown that higher rates are needed for satisfactory control of annual grasses. In these situations, rates from 8 to 16 fl. oz./A may be applied. Do not apply more than 8 fl. oz./A of CLETHODIM 2 EC per application to the following crops: asparagus, carrot, cranberry, cucurbits, flax, fruiting vegetables (except tomato), garden beet, green onion, head and stem brassica vegetables, herbs, hops, leaf petioles, leafy brassica greens, leafy greens, non-bearing food crops, root vegetables, safflower, sesame and strawberry. Do not apply more than 6 fl. oz./A of CLETHODIM 2 EC per application to canola or mustard seed.
2. When a cereal grain crop (such as wheat) is interseeded for crop establishment or is planted as wind breaks to aid crop establishment, the minimum CLETHODIM 2 EC use rate for control is 8 fl. oz./A.
3. Volunteer Corn: Includes Roundup Ready, Liberty Link and IMI-CORN volunteer corn.

4. Includes Volunteer Corn (S.R.): Sethoxydim resistant volunteer corn.

#### USE DIRECTIONS FOR PERENNIAL GRASSES

- Apply only to actively growing grasses at labelled weed heights.
- Apply when the first grass weed species in a mixed grass weed population reaches the labelled growth stage for treatment.
- Use the high rate under heavy grass pressure and/or when grasses are at maximum height.
- Do not apply more than 8 fl. oz./A of CLETHODIM 2 EC per application to the following crops: asparagus, carrot, cranberry, cucurbits, flax, fruiting vegetables (except tomato), garden beet, green onion, head & stem brassica vegetables, herbs, hops, leaf petioles, leafy brassica greens, leafy greens, non-bearing food crops, root vegetables, safflower, sesame and strawberry. Do not apply more than 6 fl. oz./A of CLETHODIM 2 EC per application to canola or mustard seed.
- Control of quackgrass, perennial bluegrass and bentgrass with CLETHODIM 2 EC may be enhanced by adding AMS at 2.5 to 4.0 lbs./A.

#### Method

[Broadcast/Foliar Air](#)

[Broadcast/Foliar Ground](#)

[Spot treatment](#)

#### Pre-Harvest Interval

70 days

#### Rates

[field rates 0](#)

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#### Restricted Entry Interval

24 hours

#### Timings

[Postemergence \(Weed\)](#)