



**RESTRICTED USE PESTICIDE  
DUE TO ACUTE INHALATION TOXICITY TO HUMANS.**  
For retail sale to and use by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification.

# Sectagon-42<sup>®</sup>

Agricultural Fumigant

**FUMIGANT SOLUTION FOR SPECIFIC CROPS AS LISTED IN THIS LABEL**

For suppression of: Nematodes, Fungi, Bacteria, Weeds, Weed seeds and Volunteer seeds.

**42.2% SODIUM METHYLDITHIOCARBAMATE**

**ACTIVE INGREDIENT:**

Sodium methyldithiocarbamate (anhydrous)] . . . . . 42.2%

**OTHER INGREDIENTS:** . . . . . 57.8%

**TOTAL:** . . . . . 100.0%

Contains 4.22 lbs. active ingredient per gallon.

**KEEP OUT OF REACH OF CHILDREN  
DANGER PELIGRO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.  
(If you do not understand the label, find someone to explain it to you in detail.)

<b>FIRST AID</b>	
<b>If on skin or clothing:</b>	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.
<b>If in eyes:</b>	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.
<b>If inhaled:</b>	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 treatment advice.
<b>If swallowed:</b>	Call 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.
<b>HOT LINE NUMBER</b>	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-866-374-1975 for emergency medical treatment information.	
<b>NOTE TO PHYSICIAN</b>	
Probable mucousal damage may contraindicate the use of gastric lavage.	

**EPA Reg. No. 61842-6**

**EPA Est. No. 61842-ID-001**

**EPA Est. No. 61842-WA-002**

**Manufactured by:**

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1-800-525-2803

**Net Contents:**



## PRECAUTIONARY STATEMENTS

### HAZARDS TO HUMANS AND DOMESTIC ANIMALS DANGER

- Corrosive: causes skin damage. May be fatal if absorbed through the skin. Do not get on skin or clothing.
- Prolonged or frequent repeated skin contact may cause allergic reactions in some individuals.
- Harmful if swallowed.
- Harmful if inhaled. Irritating to eyes, nose, and throat. Avoid breathing vapor or spray mist.
- Irritating to eyes. Do not get in eyes.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are barrier laminate or viton > 14 mils. For more options, follow the instructions for category H on an EPA chemical resistance category selection chart.

Handlers applying via weed sprayer while irrigation sprinklers are running or handlers who may be exposed to liquid spray while repairing a malfunctioning chemigation system or shutting off equipment must wear:

- chemical-resistant coveralls over long-sleeve shirt and long pants,
- chemical-resistant gloves,
- chemical-resistant footwear plus socks,
- chemical-resistant headgear,
- protective eyewear, and
- respirator of the type specified in the respiratory protection section in the PPE requirements on this label.

Handlers wearing chemical-resistant attire are limited to 30 minutes of exposure in any 60 minute period to prevent heat illness, and, as required by the Worker Protection Standard for Agricultural Pesticides, employers of these handlers must take any necessary steps to avoid heat illness.

Except as required above, handlers transferring or loading liquid formulations, handlers operating motorized ground equipment with open cabs, handlers repairing or inactivating irrigation or chemigation equipment during application, and handlers cleaning up spills or equipment, must wear:

- coveralls over long-sleeve shirt and long pants,
- chemical resistant gloves,
- chemical resistant footwear plus socks,
- chemical-resistant apron if transferring or loading the fumigant or cleaning up spills or equipment,
- protective eyewear, and
- respirator of the type specified in the PPE requirements for respiratory protection section in the PPE requirements on this label if triggered.

All other handlers including handlers operating motorized ground equipment with closed cabs (except for fumigant handlers who set up and calibrate chemigation and irrigation equipment and start the application from inside the application block) as stated in this labeling must wear:

- long-sleeve shirt and long pants,
- shoes plus socks, and
- respirator of the type specified in the eye and respiratory protection section in the PPE requirements on this label if triggered.

All handlers who set-up and calibrate chemigation and irrigation equipment and start the application from inside the application block must wear:

- long-sleeve shirt and long pants,
- shoes plus socks,
- protective eyewear, and
- respirator of the type specified in the respiratory protection section in the PPE requirements on this label if triggered.

### PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR RESPIRATORY PROTECTION

When respiratory protection is required, in lieu of protective eyewear, handlers must wear:

- at least a NIOSH-approved full-face, or helmet/hood style respirator with either

- an organic-vapor-removing cartridge with a prefilter approved for pesticides (NIOSH approval number prefix TC-23C), or
- a respirator with a canister with any N, R, P or HE prefilter approved for pesticides (NIOSH approval number prefix TC-14G).

### USER SAFETY REQUIREMENTS

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

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

DO NOT transport contaminated clothing inside a closed vehicle unless stored in a sealed container. Wash or dispose as specified.

### USER SAFETY RECOMMENDATIONS

Users should:

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

### ENVIRONMENTAL HAZARDS

This pesticide is toxic to mammals, birds, aquatic invertebrates and fish. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash waters or rinsate.

Metam-sodium has certain properties and characteristics in common with chemicals that have been detected in groundwater (highly soluble in water and has low adsorption to soil).

For untarped applications, leaching and runoff may occur if there is heavy rainfall after soil fumigation. Apply this product only as specified on this label.

### USE PRECAUTIONS

Keep off desirable lawns and plants. Do not apply within 3 feet of the drip line of desirable plants, shrubs or trees. Do not use in confined areas without adequate ventilation OR where fumes may enter nearby dwellings. Do not use in greenhouses. Keep container tightly closed when not in use. Do not store near feed or food.

### STORAGE AND DISPOSAL

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

**PESTICIDE STORAGE:** Store in a cool, dry place, keep container closed when not in use. Do not store below 0° F. Product crystallizes at lower temperatures. Warm or store at higher temperatures and mix to redissolve crystals and assure uniformity before use.

Do not stack more than three drums high. Leaking or damaged drums should be placed in overpack drums for disposal. Spills should be absorbed in sawdust or sand and disposed of in a sanitary landfill. Keep container closed when not in use.

**PESTICIDE DISPOSAL:** Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instruction, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

**CONTAINER DISPOSAL: [NON-REFILLABLE CONTAINERS]** Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: 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. Turn the container over onto its other 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. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

#### **[REFILLABLE CONTAINERS]**

Refillable container. 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 from this container into application equipment or mix tank. Fill the container about 10 percent 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. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

**NOTE OF WARNING: CONTAINER IS NOT SAFE FOR FOOD,  
FEED OR DRINKING WATER!**

### **DIRECTIONS FOR USE**

For suppression of: Nematodes, Fungi, Bacteria, Weeds, Weed seeds and Volunteer seeds. It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Use in greenhouses is prohibited. Application with handheld equipment is prohibited.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

The following activities are prohibited from being performed in the fumigant application block (i.e., the field or portion of a field treated with a fumigant in any 24-hour period or, for center pivot applications which occur over many days, the total acres of a field treated) by anyone other than persons who have been appropriately trained and equipped as handlers in accordance with the requirements in the Worker Protection Standard (40 CFR Part 170), from the start of the application until the entry-restricted period ends (NOTE: persons installing, perforating, removing, repairing, and monitoring tarps are considered handlers for the durations listed below). Those activities include those persons:

- Participating in the application as supervisors, loaders, drivers, tractor co-pilots, shovelers, cross ditchers, or as other direct application participants (the application starts when the fumigant is first introduced into the soil and ends after the fumigant has stopped being delivered/dispensed to the soil);
- Using devices to take air samples to monitor fumigant air concentrations;
- Persons cleaning up fumigant spills (this does not include emergency personnel not associated with the fumigation application);
- Handling or disposing of fumigant containers;
- Cleaning, handling, adjusting, or repairing the parts of fumigation equipment that may contain fumigant residues;
- Installing, repairing, operating or removing irrigation equipment in the application block;
- Entering the application site to perform scouting, crop advising, or monitoring tasks;
- Installing, perforating (cutting, punching, slicing, poking), removing, repairing, or monitoring tarps:
  - until 14 days after application is complete if tarps are not perforated and removed during those 14 days, or
  - until tarp removal is complete if tarps are **both** perforated **and** removed less than 14 days after application; or
  - until 48 hours after tarps perforation is complete if they will not be removed within 14 days after application.

**NOTE:** see Tarp Perforation **and/or** Removal section on this labeling for requirements about when tarps are allowed to be perforated.

- Performing any handling tasks as defined by the Worker Protection Standard
- In addition to the above, persons outside the perimeter of the application block who visually monitor application equipment to ensure proper functioning and monitor fumigant air concentration in accordance with the fumigant site monitoring requirement must also be trained and equipped as handlers in accordance with the requirements in the Worker Protection Standard (40 CFR Part 170).

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

### **PROTECTION FOR HANDLERS**

For all applications except water run: from the start of the application until the fumigant has stopped being delivered/dispensed into the soil, i.e., after the soil is sealed, the certified applicator must be at the fumigation site in the line of sight of the application and must directly supervise all persons performing handling activities.

For all water-run applications (e.g., sprinkler/chemigation, wheel line, center pivot, lateral move, drip, flood, etc.), the certified applicator must be at the fumigation site in the line of sight of the application to start the application including set-up, calibration, and initiation of the application. The certified applicator may leave the site but must return at least every two hours to visually inspect the equipment to ensure proper functioning and must directly supervise all Worker Protection Standard trained handlers on-site until the fumigation has stopped being delivered/dispensed into the soil. Worker Protection Standard-trained handlers may perform the monitoring functions in place of the certified applicator but must be under the supervision of the certified applicator and able to communicate with the certified applicator at all times during monitoring activities via cell phone or other means. The results of monitoring activities must be captured in the Fumigant Management Plan (FMP).

For handling activities that take place after the fumigant has been delivered/dispensed into the soil until the entry restricted period expires, the certified applicator does not have to be on-site, but must have communicated, in a manner that can be understood by the site owner/operator and handlers responsible for carrying out those activities, the information necessary to comply with the label and procedures described in the FMP (e.g., emergency response plans and procedures).

The results of communication activities must be captured in the FMP.

**IMPORTANT:** This requirement does not override the requirements in the Worker Protection Standard for Agricultural Pesticides for information exchange between owners/operators of agricultural establishments and commercial pesticide applicators.

The certified applicator must provide Fumigant Safe Handling information to each handler involved in the application or confirm that each handler participating in the application has received Fumigant Safe Handling information in a manner they can understand in the past twelve months. Fumigant Safe Handling information will be provided where this product is purchased or at [www.epa.gov/fumiganttraining](http://www.epa.gov/fumiganttraining).

The certified applicator supervising the application and the owner/operator of the establishment where the fumigation is taking place must make sure that all persons who are not trained and PPE-equipped and who are not performing one of the handling tasks defined in this labeling are excluded from application block during the entry restricted period.

The employer of any handler (as stated in this label) must make sure that all handlers are provided and correctly wear the required PPE. The PPE must be cleaned and maintained as required by the Worker Protection Standard for Agricultural Pesticides.

At least one handler must have the appropriate respirator and cartridges available, and they must be fit-tested, trained, and medically examined.

The fumigation handler employer must confirm and document in the FMP that an air purifying respirator and appropriate cartridges of the type specified in the PPE section of this labeling are immediately available for each handler who will wear one.

This must be documented in the FMP.

Cartridges or canisters must be replaced when odor or irritation from this product becomes apparent, if the measured concentration of MITC is greater than 6000 ppb, or after 8 hours of use, whichever occurs first.

## RESPIRATOR FIT TESTING, MEDICAL QUALIFICATION, AND TRAINING

Employers must verify that any handler that uses a respirator is:

- Fit-tested and fit-checked using a program that conforms to OSHA's requirements (see 29 CFR Part 1910.134)
- Trained using a program that conforms to OSHA's requirements (see 29 CFR Part 1910.134)
- Examined by a qualified medical practitioner to ensure physical ability to safely wear the style of respirator to be worn. A qualified medical practitioner is a physician or other licensed health care professional who will evaluate the ability of a worker to wear a respirator. The initial evaluation consists of a questionnaire that asks about medical conditions (such as a heart condition) that would be problematic for respirator use. If concerns are identified, then additional evaluations, such as a physical exam, might be necessary. The initial evaluation must be done before respirator use begins. Handlers must be reexamined by a qualified medical practitioner if their health status or respirator style or use-conditions change. Upon request by local/state/federal/tribal enforcement personnel, employers must provide documentation how they have complied with these requirements.

## RESPIRATORY PROTECTION AND STOP WORK TRIGGERS

The following procedures must be followed to determine whether an air-purifying respirator is required or if operations must cease for any person performing a handling task as defined in this labeling.

- If at any time any handler experiences sensory irritation (tearing, burning of the eyes or nose) then either:
  - An air-purifying respirator must be worn by all handlers who remain in the application block, or
  - Operations must cease and handlers not wearing an air-purifying respirator must leave the application block.
- Handlers can remove respirators or resume operations if two consecutive breathing-zone samples taken at the handling site at least 15 minutes apart show that levels of MITC have decreased to less than 600 ppb, provided that handlers do not experience sensory irritation. Samples must be taken where the irritation is first experienced.
- During the collection of air samples, an air-purifying respirator must be worn by the handler taking the air samples.
- When using monitoring devices to monitor air concentration levels, a direct reading detection device, such as a Draeger or Sensidyne device must be used. The devices must have a sensitivity of at least 600 ppb for MITC.
- When respirators are worn, then air monitoring samples must be collected at least every 2 hours in the breathing zone of a handler performing a representative handling task.
- When breathing zone samples are required, they must be taken outside respiratory protection equipment and within a ten inch radius of handler's nose and mouth.
- If at any time: (1) a handler experiences any sensory irritation when wearing an air-purifying respirator, or (2) an air sample is greater than or equal to 6,000 ppb, then all handler activities must cease and handlers must be removed from the application block. If operations cease the emergency plan detailed in the FMP must be implemented.
- Handlers can resume work activities without respiratory protection, if two consecutive breathing zone samples taken at the handling site at least 15 minutes apart show levels of MITC have decreased to less than 600 ppb, provided that handlers do not experience sensory irritation. During the collection of air samples an air-purifying respirator must be worn by the handler taking the air samples. Samples must be taken where the irritation is experienced.
- Work activities can resume if all the following conditions exist provided that the appropriate air-purifying respirator is worn:
  - Two consecutive breathing zone samples for MITC taken at the handling site at least 15 minutes apart must be less than 6,000 ppb,
  - Handlers do not experience sensory irritation while wearing the air-purifying respirator, and
  - Cartridges have been changed.
  - During the collection of air samples an air-purifying respirator must be worn by

the handler taking the air samples. Samples must be taken where the irritation is first experienced.

## TARP PERFORATION AND/OR REMOVAL

**IMPORTANT:** Persons perforating, repairing, removing, and/or monitoring tarps are defined, within certain time limitations, as handlers (see definition of fumigant handlers in this labeling) and must be provided the PPE and other protections for handlers as required on this labeling and in the Worker Protection Standard for Agricultural Pesticides.

- Tarps must not be perforated until a minimum of 5 days (120 hours) have elapsed after the fumigant injection into the soil is complete (e.g., after injection of the fumigant product and tarps have been laid or after drip lines have been purged and tarps have been laid), unless a weather condition exists which necessitates the need for early perforation or removal. See *Early Tarp Removal for Broadcast Applications Only and Early Tarp Perforation for Flood Prevention Activities sections*.
- If tarps will be removed before planting, tarp removal must not begin until at least 2 hours after tarp perforation is complete.
- If tarps will not be removed before planting, planting or transplanting must not begin until at least 48 hours after the tarp perforation is complete.
- If tarps are left intact for a minimum of 14 days after fumigant injection into the soil is complete, planting or transplanting may take place while the tarps are being perforated.
- Each tarp panel used for broadcast fumigation must be perforated.
- Tarps used for fumigations may be perforated manually **ONLY** for the following situations:
  - At the beginning of each row when a coultter blade (or other device which performs similarly) is used on a motorized vehicle such as an ATV.
  - In fields that are 1 acre or less.
  - During flood prevention activities.
- In all other instances tarps must be perforated (cut, punched, poked, or sliced) only by mechanical methods.
- Tarp perforation for broadcast fumigations must be completed before noon.
- For broadcast fumigations, tarps must not be perforated if rainfall is expected within 12 hours.
- Early Tarp Removal for Broadcast Applications Only:
  - Tarps may be removed before the required 5 days (120 hours) if adverse weather conditions have compromised the integrity of the tarp, provided that the compromised tarp poses a safety hazard. *Adverse weather* includes high wind, hail, or storms that blow tarps off the field and create a hazard, e.g., tarps blowing into power lines and onto roads. A *compromised tarp* is a tarp that due to an adverse weather condition is no longer performing its intended function and is creating a hazard.
  - If tarps are removed before the required 5 days have elapsed due to adverse weather, the events must be documented in the post-fumigation summary section of the FMP.
- Early Tarp Perforation for Flood Prevention Activities
  - Tarp perforation is allowed before the 5 days (120 hours) have elapsed if rain necessitates field drainage.
  - Tarps must be immediately retucked and packed after soil removal.

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.

### AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR 170. This Standard contains requirements for the protection of agriculture workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification and emergency assistance. For entry-restricted period and notification requirements, see the *Entry Restricted Period* section of this labeling. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard (WPS).

For entry restricted period and notification requirements, see the *Entry Restricted Period* section of this labeling.

## ENTRY-RESTRICTED PERIOD

Entry (including early entry that would otherwise be permitted under the Worker Protection Standard) by any person – other than a correctly trained and PPE-equipped handler who is performing a handling task listed on this labeling – is PROHIBITED from the start of the application until:

- 5 days (120 hours) after the application is complete for untarped applications, or
- 5 days (120 hours) after application is complete if tarps are not perforated and removed for at least 14 days following application (Note: persons installing, repairing, or monitoring tarps are handlers until 14 days after the application is complete if tarps are not perforated and removed during those 14 days), or
- 48 hours after tarps perforation is complete if they will not be removed for at least 14 days following application, or
- Tarp removal is completed if tarps are both perforated and removed less than 14 days after application.

**NOTE:** see Tarp Perforation and/or Removal section on this labeling for requirements about when tarps are allowed to be perforated.

## NOTIFICATION REQUIREMENT

Notify workers of the application by warning them orally and by posting Fumigant Treated Area signs.

The signs must bear the skull and crossbones symbol and state:

- “DANGER/PELIGRO,”
- “Area under fumigation, DO NOT ENTER/NO ENTRE,”
- Metam Sodium fumigation in Use.”
- the date and time of fumigation,
- the date and time entry restricted period is lifted,
- “Sectagon 42”, and
- name, address, and telephone number of the certified applicator in charge of the fumigation.

Post the Fumigant Treated Area sign instead of the Worker Protection Standard sign for this application but follow all Worker Protection Standard requirements pertaining to location, legibility, size, and timing of posting and removal.

Post the Fumigant Treated Area signs at all entrances to the application block (i.e the field or portion of a field treated with a fumigant in any 24-hour period or, for center pivot applications with occur over many days, the total acres of a field treated and not separated by a 12 hour interruption).

## MANDATORY GOOD AGRICULTURAL PRACTICES (GAPs):

The following GAPs must be followed during all fumigant applications. All measurements and other documentation planned to ensure that the mandatory GAPs are achieved must be recorded in the FMP and/or the post-application summary report.

### Shank Applications

#### Wind Speed

- Wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach at least 5 mph during the application.

#### Weather Conditions

- Prior to fumigation the weather forecast for the day of the application and the 48-hour period following the fumigation *must* be checked to determine if unfavorable weather conditions exist or are predicted (see *Identifying Unfavorable Weather Conditions* section) and whether fumigation should proceed.
- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48-hour period after the start of application, or if there is an air-stagnation advisory issued by the National Weather Service in effect for the area in which the fumigation is planned.
- Detailed local forecasts for weather conditions, wind speed, and air stagnation advisories may be obtained online at: <http://www.nws.noaa.gov> or by contacting your local National Weather Service Forecasting Office.

## Identifying Unfavorable Weather Conditions

- Unfavorable weather conditions block upward movement of air, which results in trapping fumigant vapors near the ground. The resulting air mass can move off-site in unpredictable directions. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noontime. Unfavorable conditions are common on nights with limited cloud cover and light to no wind and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.

## Soil Conditions, Injection Depth, and Soil Sealing

- Soil must be in good tilth and free of large clods. Large clods can prevent effective soil sealing and reduce effectiveness of the application. If subsurface soil compaction layers (hardpans) are present within the intended fumigation treatment zone, a deep tillage to fracture these layers must occur prior to or as part of the soil fumigant application. The soil must be tilled, at a minimum to the depth of the treatment zone.
- Plant residue that is present must not interfere with the application or the soil seal. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural “chimneys” that may occur in the soil when plant residue is present. These “chimneys” allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.

The injection point for bedded and broadcast applications shall be a minimum of 3 inches from the final soil/air interface. Chisel traces must be eliminated following an application and the soil surface must be sealed immediately after application using one of the following methods:

- Compaction with a bed-shaper, roller, press wheel or similar device, OR
- Covering the treated soil with 3-6 inches of untreated soil, OR
- Applying a minimum of a ½-inch of water beginning immediately after application of a set and completing the water treatment within four hours, OR
- Covering treated area with a tarp.

## Tarps

- When tarps are used for emission control, tarps must be installed immediately after application.
- When tarps are used, a written tarp plan must be developed and included in the FMP that includes:
  - Schedule and procedures for checking tarps for damage, tears, and other problems,
  - Plans for determining when and how repairs to tarp will be made, and by whom,
  - Minimum time following injection that tarp will be repaired,
  - Minimum size of damage that will be repaired,
  - Other factors used to determine when tarp repair will be conducted,
  - Schedule, equipment and methods used to cut tarp,
  - Aeration plans and procedures following cutting and/or slitting prior to tarp removal or planting, and
  - Schedule, equipment, and procedures for tarp removal.

## Soil Temperature

- At the beginning of the application, the maximum soil temperature at the injection depth is 90 degrees F.
- If air temperatures have been above 100 degrees F in any of the three days prior to application, then soil temperature must be measured and recorded in the FMP.

## Soil Moisture

- The soil moisture in the top six inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application, subject to the exception below.
- **EXCEPTION:** In areas where soil moisture must exceed field capacity to form a bed (e.g., certain regions in Florida), soil capacity (field capacity) may exceed the 80% allocated above.
- If appropriate measuring equipment is not used to determine whether the soil moisture

in the top six inches of soil is between 60% to 80% of soil capacity (field capacity) immediately prior the application, the USDA *Feel Method* test may be used to help estimate whether the 60% to 80% soil capacity (field capacity) requirement is met:

**coarse** textured soils (fine sand and loamy fine sand) there must be enough moisture (50 - 75% available soil water moisture) to form a weak ball with loose and clustered sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.

**moderately coarse** textured soils (sandy loam and fine sandy loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.

**medium** textured soils (sandy clay loam, loam, and silt loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball, very light staining on fingers, darkened color, pliable, and forms a weak ribbon between the thumb and forefinger.

**fine** textured soils (clay, clay loam, and silty clay loam) there must be enough moisture (50 - 75% available soil water moisture) to form a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.

For **fields with more than one soil texture**, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. The field may be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If there is uncertainty in determining the soil moisture content of the area to be treated, a local extension service or soil conservation service specialist or pest control advisor (agriculture consultant) should be consulted for assistance.

- If there is insufficient moisture throughout the top six inches of soil immediately prior to the application, the soil moisture must be adjusted. If there is adequate soil moisture below six inches, soil moisture can be brought to the surface by tillage before or during injection. To conserve existing soil moisture, tillage should be done as close to the time of application as possible.

## APPLICATION AND EQUIPMENT CONSIDERATIONS

- Do not apply or allow fumigant to drain or drip onto the soil surface. Injectors must be placed below the soil surface before product flow begins. For each injection line either have a check valve located as close as possible to the final injection point, or drain/purge the line of any remaining fumigant prior to lifting injection shanks from the ground. Do not lift injection shanks from the soil until the shut-off valve has been closed and the fumigant has been depressurized (passively drained) or purged (actively forced out via air compressor) from the system.
- Application equipment must be in good working order.
- All tanks, hoses, fittings, valves and connections must be serviceable, tightened, sealed and not leaking.
- Dry connect fittings (closed transfer system) must be installed on all tanks and transfer hoses.
- Sight gauges and pressure gauges must be working.
- Nozzles and metering devices must be the correct size and sealed and unobstructed.
- Use only tanks, hoses and fittings designed to withstand the pressure of the system and resistant to metam.
- Each nozzle must be equipped with a flow monitor, e.g. mechanical, electronic, or Red-ball type monitor.
- For undiluted product, aluminum, brass, copper, galvanized iron, and zinc materials cannot be used.
- All rigs must include a filter to remove any particulates from the fumigant, and a check valve that is visible to the tractor pilot during application to prevent backflow of the

fumigant into the pressurizing cylinder.

- All rigs must include a flow meter or a flow monitoring device.
- All rigs must have a constant pressure system with orifice plates to insure the proper amount of fumigant is applied.
- Valves, vacuum relief valves, and low pressure drains must be in place, operational, and leak free.
- Interlocking controls must be installed and functioning.
- Use only positive displacement pumps. Do NOT use impellers made of brass, aluminum, or galvanized material.
- Before using a fumigation rig for the first time, or when preparing it for use after storage, the operator must check the following items carefully:
  - Check the filter, and clean or replace the filter element as required.
  - Check all tubes and chisels to make sure they are free of debris and obstructions.
  - Check and clean the orifice plates.

## Spray Blade Applications (includes bed-top blade and soil cap applications)

### Wind Speed

- Wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach at least 5 mph during the application.

### Weather Conditions

- Prior to fumigation the weather forecast for the day of the application and the 48-hour period following the fumigation *must* be checked to determine if unfavorable weather conditions exist or are predicted (see *Identifying Unfavorable Weather Conditions* section) and whether fumigation should proceed.
- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48-hour period after the start of application, or if there is an air-stagnation advisory issued by the National Weather Service in effect for the area in which the fumigation is planned.
- Detailed local forecasts for weather conditions, wind speed, and air stagnation advisories may be obtained online at: <http://www.nws.noaa.gov> or by contacting your local National Weather Service Forecasting Office.

### Identifying Unfavorable Weather Conditions

- Unfavorable weather conditions block upward movement of air, which results in trapping fumigant vapors near the ground. The resulting air mass can move off-site in unpredictable directions. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noontime. Unfavorable conditions are common on nights with limited cloud cover and light to no wind and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.

### Soil Conditions, Injection Depth, and Soil Sealing

- Soil must be in good tilth and free of large clods. Large clods can prevent effective soil sealing and reduce effectiveness of the application. If subsurface soil compaction layers (hardpans) are present within the intended fumigation treatment zone, a deep tillage to fracture these layers must occur prior to or as part of the soil fumigant application. The soil must be tilled, at a minimum to the depth of the treatment zone.
- Plant residue that is present must not interfere with the application or the soil seal. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural “chimneys” that may occur in the soil when plant residue is present. These “chimneys” allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.

Apply the product on the soil immediately ahead of the bed-shaping equipment. The soil surface must be compacted immediately after application using one of the following methods:

- Compaction with a bed-shaper, roller, press wheel or similar device, OR
- Covering the treated soil with 3-6 inches of untreated soil, OR

- Applying a minimum of a ½-inch of water beginning immediately after application of a set and completing the water treatment within four hours, OR
- Covering treated area with a tarp.

### Tarps

- When tarps are used for emission control, tarps must be installed immediately after application.
- When tarps are used, a written tarp plan must be developed and included in the FMP that includes:
  - Schedule and procedures for checking tarps for damage, tears, and other problems,
  - Plans for determining when and how repairs to tarp will be made, and by whom,
  - Minimum time following injection that tarp will be repaired,
  - Minimum size of damage that will be repaired,
  - Other factors used to determine when tarp repair will be conducted,
  - Schedule, equipment and methods used to cut tarp,
  - Aeration plans and procedures following cutting and /or slitting prior to tarp removal or planting, and
  - Schedule, equipment, and procedures for tarp removal.

### Soil Temperature

- At the beginning of the application, the maximum soil temperature at the injection depth is 90 degrees F.
- If air temperatures have been above 100 degrees F in any of the three days prior to application, then soil temperature must be measured and recorded in the FMP.

### Soil Moisture

- The soil moisturing in the top six inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application, subject to the exception below.
- **EXCEPTION:** In areas where soil moisture must exceed field capacity to form a bed (e.g., certain regions in Florida), soil capacity (field capacity) may exceed the 80% allocated above.
- If appropriate measure equipment is not used to determine whether the soil moisture in the top six inches of soil is between 60% to 80% of soil capacity (field capacity) immediately prior the application, the USDA *Feel Method* test may be used to help estimate whether the 60% to 80% soil capacity (field capacity) requirement is met:

**coarse** textured soils (fine sand and loamy fine sand) there must be enough moisture (50 - 75% available soil water moisture) to form a weak ball with loose and clustered sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.

**moderately coarse** textured soils (sandy loam and fine sandy loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.

**medium** textured soils (sandy clay loam, loam, and silt loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball, very light staining on fingers, darkened color, pliable, and forms a weak ribbon between the thumb and forefinger.

**fine** textured soils (clay, clay loam, and silty clay loam) there must be enough moisture (50 - 75% available soil water moisture) to form a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.

For **fields with more than one soil texture**, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. The field may be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If there is uncertainty in determining the soil moisture content of the area to be treated, a local extension service or soil conservation service specialist or pest control advisor

(agriculture consultant) should be consulted for assistance.

- If there is insufficient moisture throughout the top six inches of soil immediately prior to the application, the soil moisture must be adjusted. If there is adequate soil moisture below six inches, soil moisture can be brought to the surface by tillage before or during injection. To conserve existing soil moisture, pretreatment or treatment tillage should be done as close to the time of application as possible.

### Application and Equipment Considerations

- Do not apply or allow fumigant to drain or drip onto the soil surface
- Application equipment must be in good working order.
- All tanks, hoses, fittings, valves and connections must be serviceable, tightened, sealed and not leaking.
- Dry connect fittings (closed transfer system) must be installed on all tanks and transfer hoses.
- Sight gauges and pressure gauges must be working.
- Nozzles and metering devices must be the correct size and sealed and unobstructed.
- Use only tanks, hoses and fittings designed to withstand the pressure of the system and resistant to metam.
- Each nozzle must be equipped with a flow monitor, e.g. mechanical, electronic, or Red-ball type monitor.
- For undiluted product, aluminum, brass, copper, galvanized iron, and zinc materials cannot be used.
- All rigs must include a filter to remove any particulates from the fumigant, and a check valve that is visible to the tractor pilot during application to prevent backflow of the fumigant into the pressurizing cylinder.
- Before using a fumigation rig for the first time, or when preparing it for use after storage, the operator must check the following items carefully:
  - Check the filter, and clean or replace the filter element as required.
  - Check all tubes and chisels to make sure they are free of debris and obstructions.
  - Check and clean the orifice plates.

### Rotary Tiller Applications

#### Wind Speed

- Wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach at least 5 mph during the application.

#### Weather Conditions

- Prior to fumigation the weather forecast for the day of the application and the 48-hour period following the fumigation *must* be checked to determine if unfavorable weather conditions exist or are predicted (see *Identifying Unfavorable Weather Conditions* section) and whether fumigation should proceed.
- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48-hour period after the start of application, or if there is an air-stagnation advisory issued by the National Weather Service in effect for the area in which the fumigation is planned.
- Detailed local forecasts for weather conditions, wind speed, and air stagnation advisories may be obtained online at: <http://www.nws.noaa.gov> or by contacting your local National Weather Service Forecasting Office.

#### Identifying Unfavorable Weather Conditions

- Unfavorable weather conditions block upward movement of air, which results in trapping fumigant vapors near the ground. The resulting air mass can move off-site in unpredictable directions. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noontime. Unfavorable conditions are common on nights with limited cloud cover and light to no wind and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.

#### Soil Conditions, Injection Depth, and Soil Sealing

- Soil must be in good tilth and free of large clods. Large clods can prevent effective soil sealing and reduce effectiveness of the application. If subsurface soil compaction layers (hardpans) are present within the intended fumigation treatment zone, a deep tillage to fracture these layers must occur prior to or as part of the soil fumigant

application. The soil must be tilled, at a minimum to the depth of the treatment zone.

- Plant residue that is present must not interfere with the application or the soil seal. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural “chimneys” that may occur in the soil when plant residue is present. These “chimneys” allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.

Apply the product on the soil immediately ahead of the tiller. The soil surface must be compacted immediately after application using one of the following methods:

- Compaction with a bed-shaper, roller, press wheel or similar device, OR
- Covering the treated soil with 3-6 inches of untreated soil, OR
- Applying a minimum of a ½-inch of water beginning immediately after application of a set and completing the water treatment within four hours, OR
- Covering treated area with a tarp.

### Tarps

- When tarps are used for emission control, tarps must be installed immediately after application.
- When tarps are used, a written tarp plan must be developed and included in the FMP that includes:
  - Schedule and procedures for checking tarps for damage, tears, and other problems,
  - Plans for determining when and how repairs to tarp will be made, and by whom,
  - Minimum time following injection that tarp will be repaired,
  - Minimum size of damage that will be repaired,
  - Other factors used to determine when tarp repair will be conducted,
  - Schedule, equipment and methods used to cut tarp,
  - Aeration plans and procedures following cutting and /or slitting prior to tarp removal or planting, and
  - Schedule, equipment, and procedures for tarp removal.

### Soil Temperature

- At the beginning of the application, the maximum soil temperature at the injection depth is 90 degrees F.
- If air temperatures have been above 100 degrees F in any of the three days prior to application, then soil temperature must be measured and recorded in the FMP.

### Soil Moisture

- The soil moisture in the top six inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application, subject to the exception below.
- **EXCEPTION:** In areas where soil moisture must exceed field capacity to form a bed (e.g., certain regions in Florida), soil capacity (field capacity) may exceed the 80% allocated above.
- If appropriate measuring equipment is not used to determine whether the soil moisture in the top six inches of soil is between 60% to 80% of soil capacity (field capacity) immediately prior the application, the USDA *Feel Method* test may be used to help estimate whether the 60% to 80% soil capacity (field capacity) requirement is met:

**coarse** textured soils (fine sand and loamy fine sand) there must be enough moisture (50 - 75% available soil water moisture) to form a weak ball with loose and clustered sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.

**moderately coarse** textured soils (sandy loam and fine sandy loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.

**medium** textured soils (sandy clay loam, loam, and silt loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball, very light staining on fingers, darkened color, pliable, and forms a weak ribbon between the thumb and forefinger.

**fine** textured soils (clay, clay loam, and silty clay loam) there must be enough moisture (50 - 75% available soil water moisture) to form a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.

For **fields with more than one soil texture**, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. The field may be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If there is uncertainty in determining the soil moisture content of the area to be treated, a local extension service or soil conservation service specialist or pest control advisor (agriculture consultant) should be consulted for assistance.

- If there is insufficient moisture throughout the top six inches of soil immediately prior to the application, the soil moisture must be adjusted. If there is adequate soil moisture below six inches, soil moisture can be brought to the surface by tillage before or during injection. To conserve existing soil moisture, tillage should be done as close to the time of application as possible.

### Application and Equipment Considerations

- Do not apply or allow fumigant to drain or drip onto the soil surface.
- Application equipment must be in good working order.
- All tanks, hoses, fittings, valves and connections must be serviceable, tightened, sealed and not leaking.
- Dry connect fittings (closed transfer system) must be installed on all tanks and transfer hoses.
- Sight gauges and pressure gauges must be working.
- Nozzles and metering devices must be the correct size and sealed and unobstructed.
- Use only tanks, hoses and fittings designed to withstand the pressure of the system and resistant to metam.
- Each nozzle must be equipped with a flow monitor, e.g. mechanical, electronic, or Red-ball type monitor.
- For undiluted product, aluminum, brass, copper, galvanized iron, and zinc materials cannot be used.
- All rigs must include a filter to remove any particulates from the fumigant, and a check valve that is visible to the tractor pilot during application to prevent backflow of the fumigant into the pressurizing cylinder.
- Before using a fumigation rig for the first time, or when preparing it for use after storage, the operator must check the following items carefully:
  - Check the filter, and clean or replace the filter element as required.
  - Check all tubes and chisels to make sure they are free of debris and obstructions.
  - Check and clean the orifice plates.

## Center Pivot Applications

### Wind Speed

- For sprinkler or center pivot applications: 1) not using a solid stream type nozzle, OR 2) having a release height or spray height greater than 4 feet, OR 3) having 30 lbs or greater PSI at the sprinkler head, wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach 5 mph during the application and the maximum wind speed is 10 mph.
- For sprinkler or center pivot applications using 1) solid stream, AND 2) having release height and spray height less than 4 feet, AND 3) having 29 lbs. or less PSI at the sprinkler head, wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach 5 mph during the application and the maximum wind speed is 25 mph.

### Weather Conditions

- Prior to fumigation the weather forecast for the day of the application and the 48-hour period following the fumigation *must* be checked to determine if unfavorable weather conditions exist or are predicted (see *Identifying Unfavorable Weather Conditions*

section) and whether fumigation should proceed.

- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48-hour period after the start of application, or if there is an air-stagnation advisory issued by the National Weather Service in effect for the area in which the fumigation is planned.
- Detailed local forecasts for weather conditions, wind speed, and air stagnation advisories may be obtained online at: <http://www.nws.noaa.gov> or by contacting your local National Weather Service Forecasting Office.

### Identifying Unfavorable Weather Conditions

- Unfavorable weather conditions block upward movement of air, which results in trapping fumigant vapors near the ground. The resulting air mass can move off-site in unpredictable directions. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noontime. Unfavorable conditions are common on nights with limited cloud cover and light to no wind and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.

### Soil Conditions

- Soil must be in good tilth and free of large clods. Large clods can prevent effective soil sealing and reduce effectiveness of the application. If subsurface soil compaction layers (hardpans) are present within the intended fumigation treatment zone, tillage to fracture these layers must occur. The soil must be tilled before or during the application, at a minimum to the depth of the intended treatment zone.
- Plant residue that is present must not interfere with the application or the soil seal. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Except when applying over cover crops as set forth in the General Instructions for Sprinkler System, crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural "chimneys" that may occur in the soil when plant residue is present. These "chimneys" allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.

### Soil Temperature

- At the beginning of the application, the maximum soil temperature is 90 degrees F, measured at 3 inches in depth.
- If air temperatures have been above 100 degrees F in any of the three days prior to application, then soil temperature must be measured and recorded in the FMP.

### Soil Moisture

- The soil moisture in the top six inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application.
- If appropriate measuring equipment is not used to determine whether the soil moisture in the top six inches of soil is between 60% to 80% of soil capacity (field capacity) immediately prior to the application, the USDA *Feel Method* test may be used to help estimate whether the 60% to 80% soil capacity (field capacity) requirement is met:

**coarse** textured soils (fine sand and loamy fine sand) there must be enough moisture (50 - 75% available soil water moisture) to form a weak ball with loose and clustered sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.

**moderately coarse** textured soils (sandy loam and fine sandy loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.

**medium** textured soils (sandy clay loam, loam, and silt loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball, very light staining on fingers, darkened color, pliable, and forms a weak ribbon between the thumb and forefinger.

**fine** textured soils (clay, clay loam, and silty clay loam) there must be enough moisture (50 - 75% available soil water moisture) to form a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.

For **fields with more than one soil texture**, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. The field may be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If there is uncertainty in determining the soil moisture content of the area to be treated, a local extension service or soil conservation service specialist or pest control advisor (agriculture consultant) should be consulted for assistance.

- If there is insufficient moisture throughout the top six inches below the surface of soil immediately prior to the application, the soil moisture must be adjusted. If there is adequate soil moisture below six inches, soil moisture can be brought to the surface by tillage prior to the application. To conserve existing soil moisture, tillage should be done as close to the time of application as possible.

### Flushing Irrigation Lines

- Do not allow fumigant to remain in the irrigation system after the application is complete. After application of the fumigant, flush the injection and irrigation system with untreated water. The flush time must be adequate to purge the fumigant from the injection and irrigation system, but should be less than the amount that could over-saturate the beds. If common lines are used for both the fumigant application and the water treatment/seal (if applied), these lines must be adequately flushed before starting the water treatment/seal.

### Application and Equipment Considerations

- Anti-siphon and back-flow prevention devices must be installed and in working order.
- Use only tanks constructed with materials approved for handling metam. Tanks must be in good condition to ensure product does not spill or leak.
- Tanks must have proper pesticide labels on them.
- All tanks, hoses, fittings, valves and connections must be serviceable, tightened, sealed and not leaking.
- Use only tanks, hoses and fittings designed to withstand the pressure of the system and resistant to metam.
- Use only positive displacement pumps. Do NOT use impellers made of brass, aluminum, or galvanized material.
- For undiluted product, aluminum, brass, copper, galvanized iron, and zinc materials cannot be used.
- The system must contain a functional check valve, vacuum relief valve, inspection port, and low-pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.
- The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid 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 that will stop the 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.

### Solid Set Sprinkler Applications

#### Wind Speed

- Wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach 5 mph during the application and the maximum wind speed is 10 mph.

## Weather Conditions

- Prior to fumigation the weather forecast for the day of the application and the 48-hour period following the fumigation *must* be checked to determine if unfavorable weather conditions exist or are predicted (see *Identifying Unfavorable Weather Conditions* section) and whether fumigation should proceed.
- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48-hour period after the start of application, or if there is an air-stagnation advisory issued by the National Weather Service in effect for the area in which the fumigation is planned.
- Detailed local forecasts for weather conditions, wind speed, and air stagnation advisories may be obtained online at: <http://www.nws.noaa.gov> or by contacting your local National Weather Service Forecasting Office.

## Identifying Unfavorable Weather Conditions

- Unfavorable weather conditions block upward movement of air, which results in trapping fumigant vapors near the ground. The resulting air mass can move off-site in unpredictable directions. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noon. Unfavorable conditions are common on nights with limited cloud cover and light to no wind and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.

## Soil Conditions

- Soil must be in good tilth and free of large clods. Large clods can prevent effective soil sealing and reduce effectiveness of the application. If subsurface soil compaction layers (hardpans) are present within the intended fumigation treatment zone, tillage to fracture these layers must occur. The soil must be tilled prior to the application, at a minimum to the depth of the treatment zone.
- Plant residue that is present must not interfere with the application or the soil seal. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Except when applying over cover crops as set forth in the General Instructions for Sprinkler Systems, crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural "chimneys" that may occur in the soil when plant residue is present. These "chimneys" allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.

## Soil Temperature

- At the beginning of the application, the maximum soil temperature is 90 degrees F, measured at 3 inches in depth.
- If air temperatures have been above 100 degrees F in any of the three days prior to application, then soil temperature must be measured and recorded in the FMP.

## Soil Moisture

- The soil moisture in the top six inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application.
- If appropriate measuring equipment is not used to determine whether the soil moisture in the top six inches of soil is between 60% to 80% of soil capacity (field capacity) immediately prior to the application, the USDA *Feel Method* test may be used to help estimate whether the 60% to 80% soil capacity (field capacity) requirement is met:

**coarse** textured soils (fine sand and loamy fine sand) there must be enough moisture (50 - 75% available soil water moisture) to form a weak ball with loose and clustered sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.

**moderately coarse** textured soils (sandy loam and fine sandy loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.

**medium** textured soils (sandy clay loam, loam, and silt loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball, very light staining on fingers, darkened color, pliable, and forms a weak ribbon between the thumb and

forefinger.

**fine** textured soils (clay, clay loam, and silty clay loam) there must be enough moisture (50 - 75% available soil water moisture) to form a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.

For **fields with more than one soil texture**, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. The field may be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If there is uncertainty in determining the soil moisture content of the area to be treated, a local extension service or soil conservation service specialist or pest control advisor (agriculture consultant) should be consulted for assistance.

- If there is insufficient moisture throughout the top six inches below the surface of soil immediately prior to the application, the soil moisture must be adjusted. If there is adequate soil moisture below six inches, soil moisture can be brought to the surface by tillage prior to the application. To conserve existing soil moisture, tillage should be done as close to the time of application as possible.

## Flushing Irrigation Lines

- Do not allow fumigant to remain in the irrigation system after the application is complete. After application of the fumigant, flush the injection and irrigation system with untreated water. The flush time must be adequate to purge the fumigant from the injection and irrigation system, but should be less than the amount that could over-saturate the beds. If common lines are used for both the fumigant application and the water treatment/seal (if applied), these lines must be adequately flushed before starting the water treatment/seal.

## Application and Equipment Considerations

- Anti-siphon and back-flow prevention devices must be installed and in working order.
- Use only tanks constructed with materials approved for handling metam. Tanks must be in good condition to ensure product does not spill or leak.
- Tanks must have proper pesticide labels on them.
- All tanks, hoses, fittings, valves and connections must be serviceable, tightened, sealed and not leaking.
- Use only tanks, hoses and fittings designed to withstand the pressure of the system and resistant to metam.
- Use only positive displacement pumps. Do NOT use impellers made of brass, aluminum, or galvanized material.
- For undiluted product, aluminum, brass, copper, galvanized iron, and zinc materials cannot be used.
- The system must contain a functional check valve, vacuum relief valve, inspection port, and low-pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.
- The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid 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 that 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.

## Drench Applications

### Wind Speed

- Wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach 5 mph during the application.

### Weather Conditions

- Prior to fumigation the weather forecast for the day of the application and the 48-hour period following the fumigation *must* be checked to determine if unfavorable weather conditions exist or are predicted (see *Identifying Unfavorable Weather Conditions* section) and whether fumigation should proceed.
- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48-hour period after the start of application, or if there is an air-stagnation advisory issued by the National Weather Service in effect for the area in which the fumigation is planned.
- Detailed local forecasts for weather conditions, wind speed, and air stagnation advisories may be obtained online at: <http://www.nws.noaa.gov> or by contacting your local National Weather Service Forecasting Office.

### Identifying Unfavorable Weather Conditions

- Unfavorable weather conditions block upward movement of air, which results in trapping fumigant vapors near the ground. The resulting air mass can move off-site in unpredictable directions. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noontime. Unfavorable conditions are common on nights with limited cloud cover and light to no wind and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.

### Soil Conditions

- Soil must be in good tilth and free of large clods. Large clods can prevent effective soil sealing and reduce effectiveness of the application. If subsurface soil compaction layers (hardpans) are present within the intended fumigation treatment zone, tillage to fracture these layers must occur. The soil must be tilled prior to the application, at a minimum to the depth of the treatment zone.
- Plant residue that is present must not interfere with the application or the soil seal. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural “chimneys” that may occur in the soil when plant residue is present. These “chimneys” allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.

### Soil Temperature

- At the beginning of the application, the maximum soil temperature is 90 degrees F, measured at 3 inches in depth.
- If air temperatures have been above 100 degrees F in any of the three days prior to application, then soil temperature must be measured and recorded in the FMP.

### Soil Moisture

- The soil moisture in the top six inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application.
- If appropriate measuring equipment is not used to determine whether the soil moisture in the top six inches of soil is between 60% to 80% of soil capacity (field capacity) immediately prior the application, the USDA *Feel Method* test may be used to help estimate whether the 60% to 80% soil capacity (field capacity) requirement is met:

**coarse** textured soils (fine sand and loamy fine sand) there must be enough moisture (50 - 75% available soil water moisture) to form a weak ball with loose and clustered sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.

**moderately coarse** textured soils (sandy loam and fine sandy loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.

**medium** textured soils (sandy clay loam, loam, and silt loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball, very light staining on fingers, darkened color, pliable, and forms a weak ribbon between the thumb and forefinger.

**fine** textured soils (clay, clay loam, and silty clay loam) there must be enough moisture (50 - 75% available soil water moisture) to form a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.

For **fields with more than one soil texture**, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. The field may be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If there is uncertainty in determining the soil moisture content of the area to be treated, a local extension service or soil conservation service specialist or pest control advisor (agriculture consultant) should be consulted for assistance.

- If there is insufficient moisture throughout the top six inches below the surface of soil immediately prior to the application, the soil moisture must be adjusted. If there is adequate soil moisture below six inches, soil moisture can be brought to the surface by tillage prior to the application. To conserve existing soil moisture, tillage should be done as close to the time of application as possible.
- Applications must be followed immediately with .20 to .50 inches of water through solid set sprinklers.
- A minimum of two or more water seals must be applied; one water seal on the first evening of the application and the second on the second evening of the day after application.

### Application and Equipment Considerations

- Anti-siphon and back-flow prevention devices must be installed and in working order.
- Use only tanks constructed with materials approved for handling metam. Tanks must be in good condition to ensure product does not spill or leak.
- Tanks must have proper pesticide labels on them.
- All tanks, hoses, fittings, valves and connections must be serviceable, tightened, sealed and not leaking.
- Dry connect fittings (closed transfer system) must be installed on all tanks and transfer hoses.
- Use only tanks, hoses and fittings designed to withstand the pressure of the system and resistant to metam.
- For undiluted product, aluminum, brass, copper, galvanized iron, and zinc materials cannot be used.
- Each nozzle must be equipped with a flow monitor, e.g., mechanical electronic, or Red-ball type monitor.
- To inject fumigant, use a metering system, effectively designed and constructed of materials that are compatible with the fumigant and capable of being fitted with system interlocking controls.
- Nozzles and metering devices are of correct size and are sealed and unobstructed.
- The system must contain a functional check valve, vacuum relief valve, inspection port, and low-pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.
- The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid 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 that 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.

## Drip Applications

### Wind Speed

- Wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach at least 5 mph during the application.

### Weather Conditions

- Prior to fumigation the weather forecast for the day of the application and the 48-hour period following the fumigation *must* be checked to determine if unfavorable weather conditions exist or are predicted (see *Identifying Unfavorable Weather Conditions* section) and whether fumigation should proceed.
- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48-hour period after the start of application, or if there is an air-stagnation advisory issued by the National Weather Service in effect for the area in which the fumigation is planned.
- Detailed local forecasts for weather conditions, wind speed, and air stagnation advisories may be obtained online at: <http://www.nws.noaa.gov> or by contacting your local National Weather Service Forecasting Office.

### Identifying Unfavorable Weather Conditions

- Unfavorable weather conditions block upward movement of air, which results in trapping fumigant vapors near the ground. The resulting air mass can move off-site in unpredictable directions. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noontime. Unfavorable conditions are common on nights with limited cloud cover and light to no wind and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.

### Soil Conditions

- Soil must be in good tilth and free of large clods. Large clods can prevent effective soil sealing and reduce effectiveness of the application. If subsurface soil compaction layers (hardpans) are present within the intended fumigation treatment zone, tillage to fracture these layers must occur. The soil must be tilled prior to the application, at a minimum to the depth of the treatment zone.
- Plant residue that is present must not interfere with the application or the soil seal. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural “chimneys” that may occur in the soil when plant residue is present. These “chimneys” allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.

### Soil Temperature

- At the beginning of the application, the maximum soil temperature is 90 degrees F, measured at 3 inches in depth.
- If air temperatures have been above 100 degrees F in any of the three days prior to application, then soil temperature must be measured and recorded in the FMP.

### Soil Moisture

- The soil moisture in the top six inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application, subject to the exception below.
- **EXCEPTION:** In areas where soil moisture must exceed field capacity to form a bed (e.g., certain regions in Florida), soil capacity (field capacity) may exceed the 80% allocated above.
- If appropriate measuring equipment is not used to determine whether the soil moisture

in the top six inches of soil is between 60% to 80% of soil capacity (field capacity) immediately prior to the application, the USDA *Feel Method* test may be used to help estimate whether the 60% to 80% soil capacity (field capacity) requirement is met:

**coarse** textured soils (fine sand and loamy fine sand) there must be enough moisture (50 - 75% available soil water moisture) to form a weak ball with loose and clustered sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.

**moderately coarse** textured soils (sandy loam and fine sandy loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.

**medium** textured soils (sandy clay loam, loam, and silt loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball, very light staining on fingers, darkened color, pliable, and forms a weak ribbon between the thumb and forefinger.

**fine** textured soils (clay, clay loam, and silty clay loam) there must be enough moisture (50 - 75% available soil water moisture) to form a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.

For **fields with more than one soil texture**, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. The field may be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If there is uncertainty in determining the soil moisture content of the area to be treated, a local extension service or soil conservation service specialist or pest control advisor (agriculture consultant) should be consulted for assistance.

- If there is insufficient moisture throughout the top six inches below the surface of soil immediately prior to the application, the soil moisture must be adjusted. If there is adequate soil moisture below six inches, soil moisture can be brought to the surface by tillage prior to the application. To conserve existing soil moisture, tillage should be done as close to the time of application as possible.

### Tarps

- When tarps are used for emission control in drip irrigation the tarps must be installed immediately after application.
- When tarps are used, a written tarp plan must be developed and included in the FMP that includes:
  - Schedule and procedures for checking tarps for damage, tears, and other problems,
  - Plans for determining when and how repairs to tarp will be made, and by whom,
  - Minimum time following injection that tarp will be repaired,
  - Minimum size of damage that will be repaired,
  - Other factors used to determine when tarp repair will be conducted,
  - Schedule, equipment and methods used to cut tarp,
  - Aeration plans and procedures following cutting and/or slitting prior to tarp removal or planting, and
  - Schedule, equipment, and procedures for tarp removal.

### Flushing Drip Irrigation Lines

- After application of the fumigant, continue to irrigate the area with water to flush the injection and irrigation system with untreated water. Do not allow fumigant to remain in the irrigation system after the application is complete. The total volume of water must be adequate to completely remove the fumigant from the irrigation system, but should be less than the amount that could over-saturate the beds. If common lines are used for both the fumigant application and the water treatment/seal (if applied), these lines must be adequately flushed before starting the water treatment/seal and/or normal irrigation practices.

## Application and Equipment Considerations

- Anti-siphon and back-flow prevention devices must be installed and in working order.
- Use only tanks constructed with materials approved for handling metam. Tanks must be in good condition to ensure product does not spill or leak.
- Tanks must have proper pesticide labels on them.
- All tanks, hoses, fittings, valves and connections must be serviceable, tightened, sealed and not leaking.
- Use only tanks, hoses and fittings designed to withstand the pressure of the system and resistant to metam.
- For undiluted product, aluminum, brass, copper, galvanized iron, and zinc materials cannot be used.
- The drip irrigation system (main lines, headers, drip tape) must be thoroughly checked for leaks before the start of the application. An adequate run-time and pressure are needed to detect leaks. Look for puddling along major pipes (holes on pipes or leaky joints), at the top and ends of rows (leaky connections, open drip tape), in the furrows and on the bed surface (damaged drip tape, malfunctioning emitters).
- To inject fumigant, use a metering system, effectively designed and constructed of materials that are compatible with the fumigant and capable of being fitted with system interlocking controls.
- The system must contain a functional check valve, vacuum relief valve, inspection port, and low-pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.
- The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid 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 that 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.
- Nozzles and metering devices are of correct size and are sealed and unobstructed.

## Flood Basin, Furrow and Border Applications

### Wind Speed

- Wind speed at the application site *must* be a minimum of 2 mph at the start of the application or forecasted to reach at least 5 mph during the application.

### Weather Conditions

- Prior to fumigation the weather forecast for the day of the application and the 48-hour period following the fumigation *must* be checked to determine if unfavorable weather conditions exist or are predicted (see *Identifying Unfavorable Weather Conditions* section) and whether fumigation should proceed.
- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48-hour period after the start of application, or if there is an air-stagnation advisory issued by the National Weather Service in effect for the area in which the fumigation is planned.
- Detailed local forecasts for weather conditions, wind speed, and air stagnation advisories may be obtained online at: <http://www.nws.noaa.gov> or by contacting your local National Weather Service Forecasting Office.

### Identifying Unfavorable Weather Conditions

- Unfavorable weather conditions block upward movement of air, which results in trapping fumigant vapors near the ground. The resulting air mass can move off-site in unpredictable directions. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noontime. Unfavorable conditions are common on

nights with limited cloud cover and light to no wind and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.

### Soil Conditions

- Soil must be in good tilth and free of large clods. Large clods can prevent effective soil sealing and reduce effectiveness of the application. If subsurface soil compaction layers (hardpans) are present within the intended fumigation treatment zone, tillage to fracture these layers must occur. The soil must be tilled prior to the application, at a minimum to the depth of the treatment zone.
- Plant residue that is present must not interfere with the application or the soil seal. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Crop residue that is present must lie flat to permit the soil to be sealed effectively and limit the natural “chimneys” that may occur in the soil when plant residue is present. These “chimneys” allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and limits the efficacy of the fumigant. Plant residue on the field serves to prevent soil erosion from both wind and water.

### Tarps

- When tarps are used for emission control, tarps must be installed immediately after application.
- When tarps are used, a written tarp plan must be developed and included in the FMP that includes:
  - Schedule and procedures for checking tarps for damage, tears, and other problems,
  - Plans for determining when and how repairs to tarp will be made, and by whom,
  - Minimum time following injection that tarp will be repaired,
  - Minimum size of damage that will be repaired,
  - Other factors used to determine when tarp repair will be conducted,
  - Schedule, equipment and methods used to cut tarp,
  - Aeration plans and procedures following cutting and /or slitting prior to tarp removal or planting, and
  - Schedule, equipment, and procedures for tarp removal.

### Soil Temperature

- At the beginning of the application, the maximum soil temperature is 90 degrees F, measured at 3 inches in depth.
- If air temperatures have been above 100 degrees F in any of the three days prior to application, then soil temperature must be measured and recorded in the FMP.

### Soil Moisture

- The soil moisture in the top six inches of soil must be between 60% to 80% of soil capacity (field capacity) immediately prior to the application, subject to the exception below.
- EXCEPTION: In areas where soil moisture must exceed field capacity to form a bed (e.g., certain regions in Florida), soil capacity (field capacity) may exceed the 80% allocated above.
- If appropriate measuring equipment is not used to determine whether the soil moisture in the top six inches of soil is between 60% to 80% of soil capacity (field capacity) immediately prior the application, the USDA *Feel Method* test may be used to help estimate whether the 60% to 80% soil capacity (field capacity) requirement is met:
  - coarse** textured soils (fine sand and loamy fine sand) there must be enough moisture (50 - 75% available soil water moisture) to form a weak ball with loose and clustered sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.

**moderately coarse** textured soils (sandy loam and fine sandy loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball with defined finger marks, very light soil/water staining on fingers, darkened color will not stick.

**medium** textured soils (sandy clay loam, loam, and silt loam) there must be enough moisture (50 - 75% available soil water moisture) to form a ball, very light staining

on fingers, darkened color, pliable, and forms a weak ribbon between the thumb and forefinger.

**fine** textured soils (clay, clay loam, and silty clay loam) there must be enough moisture (50 - 75% available soil water moisture) to form a smooth ball with defined finger marks, light soil/water staining on fingers, ribbons between thumb and forefinger.

For **fields with more than one soil texture**, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. The field may be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If there is uncertainty in determining the soil moisture content of the area to be treated, a local extension service or soil conservation service specialist or pest control advisor (agriculture consultant) should be consulted for assistance.

- If there is insufficient moisture throughout the top six inches below the surface of soil immediately prior to the application, the soil moisture must be adjusted. If there is adequate soil moisture below six inches, soil moisture can be brought to the surface by tillage prior to the application. To conserve existing soil moisture, tillage should be done as close to the time of application as possible.

### Application and Equipment Considerations

- Systems using a gravity flow pesticide dispersing system must meter the pesticide into the water at the head of the field and downstream of a hydraulic discontinuity such as a drop structure or weir box to decrease potential for water source contamination from backflow if water flow stops.
- Meter at a steady rate into 3 to 18 inches of water per treated acre during irrigation. IMPORTANT: Prior to starting the application, always inspect ditches and border areas to ensure containment of the irrigation waters. Apply only into field head ditch. DO NOT APPLY INTO ANY LATERAL DITCHES.
- Back-flow prevention devices must be installed and in working order.
- Use only tanks constructed with materials approved for handling metam. Tanks must be in good condition to ensure product does not spill or leak.
- Dry connect fittings (closed transfer system) must be installed on all tanks and transfer hoses.
- Tanks must have proper pesticide labels on them.
- All tanks, hoses, fittings, valves and connections must be serviceable, tightened, sealed and not leaking.
- Use only tanks, hoses and fittings designed to withstand the pressure of the system and resistant to metam.
- For undiluted product, aluminum, brass, copper, galvanized iron, and zinc materials cannot be used.
- To inject fumigant, use a metering system, effectively designed and constructed of materials that are compatible with the fumigant and capable of being fitted with system interlocking controls.
- Flow rates must be calibrated and checked for each application.
- All previous materials applied with the system must be cleaned thoroughly prior to fumigant application.
- System must be flushed after application to totally remove all fumigant.
- The system must contain a functional check valve, vacuum relief valve, inspection port, and low-pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.

### Site-Specific Fumigation Management Plan (FMP):

Prior to the start of fumigation, the certified applicator supervising the application must verify that a site-specific fumigation management plan (FMP) exists for each application block (i.e., the field or portion of a field treated with a fumigant in any 24-hour period, or for center pivot applications, which occur over many days, the total acres of a field treated). In addition, agricultural operations fumigating multiple application blocks as part of a larger fumigation may format their FMP in a manner whereby all of the information

that is common to all the application blocks is captured once, and any information unique to a particular application block or blocks is captured in subsequent, separate sections.

The FMP must be prepared by the certified applicator, the site owner/operator, registrant, or other party.

The certified applicator must verify in writing (sign and date) that the site-specific FMP(s) reflect current site conditions before the start of fumigation.

Each site specific FMP must contain the following elements:

- Applicator information (name, phone number, pesticide applicator license number and/or certificate number, employer name, employer address)
- General site information
  - Application block location (e.g., county, township, range, quadrant), address, or global positioning system (GPS) coordinates
  - Name, address, and, phone number of owner/operator of the application block
- General application information (target application date/window, brand name of fumigant, EPA registration number)
- Tarp information and procedures for repair, perforation and removal (if tarp is used)
  - Brand name, lot number, thickness
  - Name and phone number of person responsible for repairing tarps
  - Schedule for checking tarps for damage, tears, and other problems
  - Maximum time following notification of damage that the person(s) responsible for tarp repair will respond
  - Minimum time following application that tarp will be repaired
  - Minimum size of damage that will be repaired
  - Other factors used to determine when tarp repair will be conducted
  - Name and phone number of person responsible for cutting and/or removing tarps (if other than certified applicator)
  - Equipment/methods used to cut tarps
  - Schedule and target dates for cutting tarps
  - Schedule and target dates for removing tarps
- Soil conditions (description of soil texture in application block, method used to determine soil moisture)
- Weather conditions (summary of forecasted conditions for the day of the application and the 48-hour period following the fumigant application)
  - Wind speed
  - Inversion conditions (e.g., shallow, compressed (low-level) temperature inversion)
  - Air stagnation advisory
- Respirators and other personal protective equipment (PPE) for handlers (handler task, protective clothing, respirator type, respirator cartridge type, respirator cartridge replacement schedule, eye protection, gloves, other PPE)
- Emergency procedures (evacuation routes, locations of telephones, contact information for first responders, local/state/federal/tribal contacts, key personnel and emergency procedures/responsibilities in case of an incident, equipment/tarp/seal failure, odor complaints, or other emergencies).
- Fumigant Treated Area posting procedures (name, address, and phone number of person(s) who will post Fumigant Treated Area signs, location of posting Fumigant Treated Area signs, procedures for Fumigant Treated Area sign removal).
- Plan describing how communication will take place between applicator, land owner/operator, and other on-site handlers (e.g., tarp cutters/removers, irrigators) for complying with label requirements (e.g., treated area location, timing of tarp cutting and removal, PPE).
  - Name and phone number of persons contacted
  - Date contacted
- Authorized on-site personnel
  - Name, address, and phone number of handlers
  - Name, address, and phone number for employers of handlers
  - Tasks that each handler is authorized and trained to perform
  - For handlers designated to wear air purifying respirators (an air-purifying respirators required for a minimum of one handler):
    - date of medical qualification to wear an air-purifying respirator,
    - date of air-purifying respirator training, and

- date of fit-testing for the air-purifying respirator.
- Air monitoring plan
  - If sensory irritation is experienced, indicate whether operations will be ceased or operations will continue with an air-purifying respirator
  - If the intention is to cease operations when sensory irritation is experienced, provide the name, address, and phone number of the handler that will perform monitoring activities prior to operations resuming
- When air-purifying respirators are worn:
  - Representative handler tasks to be monitored
  - Monitoring equipment to be used and timing of monitoring
- Good Agricultural Practices (GAPs)
  - Description of applicable mandatory GAPs
  - Measurements and documentation to ensure GAPs are achieved (e.g., measurement of soil and other site conditions)
- Description of hazard communication. (e.g., The treated area has been posted in accordance with the label. Pesticide product labels and material safety data sheets are on-site and readily available for employees to review.)
- Record-keeping procedures (the owner/operator of the application block as well as the certified applicator, must keep a signed copy of the site-specific FMP for 2 years from the date of application).
- Details of elevated air concentrations monitored on-site (if applicable)
  - Location of elevated air concentration levels
  - Description of control measures or emergency procedures followed
    - When sensory irritation experienced:
      - Date and time of sensory irritation
      - Handler task/activity
      - Handler location where irritation was observed
      - Resulting action (e.g., cease operations, continue operations with air-purifying respirators)
    - When using a direct read instrument:
      - Sample date and time
      - Handler task/activity
      - Handler location
      - Air concentration
      - Sampling method
- Date of Fumigant Treated Area sign removal
- Any deviations from the FMP
- Record-keeping procedures (the owner/operator of the application block as well as the certified applicator must keep a signed copy of the post-application summary for 2 years from the date of application)."

For situations where an initial FMP is developed and certain elements do not change for multiple fumigation sites (e.g. applicator information, authorized on-site personnel, record keeping procedures, emergency procedures, etc.) only elements that have changed need to be updated in the site-specific FMP provided the following:

- The certified applicator supervising the application has verified that those elements are current and applicable to the application block before it is fumigated and has documented the verification in the site-specific FMP; and
- Record-keeping requirements are followed for the entire FMP (including elements that do not change).

Once the application begins, the certified applicator must make a copy of the FMP available for viewing by handlers involved in the fumigation. The certified applicator or the owner/operator of the application block must provide a copy of the FMP to any local/state/federal/tribal enforcement personnel who request the FMP. In the case of an emergency, the FMP must be made immediately available when requested by local/state/federal/tribal emergency response and enforcement personnel.

Within 30 days of completing the application portion of the fumigation process, the certified applicator supervising the application must complete a post-fumigation application summary that describes any deviations from FMP that have occurred, measurements taken to comply with GAPs, as well as any complaints and/or incidents that have been reported to him/her.

The Post-Application Summary must contain the following elements:

- Actual date of the application, application rate, and size of application block fumigated
- Summary of weather conditions on the day of the application and during the 48-hour period following the fumigant application
- Tarp damage and repair information (if applicable)
  - Location and size of tarp damage
  - Description of tarp/tarp seal/tarp equipment failure
  - Date and time of tarp repair
- Tarp perforation/removal details (if applicable)
  - Description of tarp removal (if different than in the FMP)
  - Date tarps were perforated
  - Date tarps were removed
- Complaint details (if applicable)
  - Person filing complaint (e.g., on-site handler, person off-site)
  - If off-site person, name, address, and phone number of person filing complaint
  - Description of control measures or emergency procedures followed after complaint
- Description of incidents, equipment failure, or other emergency and emergency procedures followed (if applicable)

### Maximum Application Rates for Pre-Plant Soil Fumigation

Maximum application rate is 320 lbs ai/A (75 gallons per treated acre).

Only for use on the following:

**Cover crops** (i.e., crops planted between periods of regular crop production to prevent soil erosion);

### Crops grown solely for seed;

As well as (in alphabetical order):

alfalfa; amaranth (including leafy amaranth, Chinese spinach, tampala); anise; apple (including balsam, crabapple); apricot; artichokes; arugula (rocket); asparagus (nursery production only); barley; basil; beans (including: lima, green, fava, seed beans); beet (including garden);

berry (including black satin berry, blackberry, blueberry, boysenberry, elderberry, lowberr, wild raspberry, youngberry, darrowberry, dewberry, cloudberry, elderberry, Cherokee blackberry, coryberry, European barberry, huckleberry, hullberry, gooseberry, cranberry, highbush cranberry, Himalayaberry, jostaberry, juneberry, Saskatoon berry, lingonberry, loganberry, lavacaberry, lucretiaberry, mammoth blackberry, marionberry, bingleberry, mountain pepper berries, mulberry, olallieberry, dirksen thornless berry, nectarberry, Oregon evergreen berry, partridgeberry, phenomenalberry, rangeberry, raspberry (black and red), ravenberry, riberry, rossberry, schisandra berry, serviceberry, Shawnee blackberry, strawberry)

bok choy; broccoli; brussels sprouts; cabbage (including Napa); calabaza; calamondin; cardoon; carrot; casaba; cauliflower; celeriac; celery (including: Chinese); celtuce; chayote (fruit); che; cherry (including: sweet and tart, chokecherry, pincherry); chervil; cheyenne; Chilean guava; Chinese greens; Chinese okra; Chinese waxgourd (Chinese preserving melon); chinquapin; chironja; chrysanthemum; cilantro; citrus citron; citrus hybrids; collard; corn salad; corn; cotton; cress (including: upland, yellow rocket, winter cress); cucumber (including: Chinese cucumber); cucuzza; currant, (including: black, red, native and other varieties and hybrids);

dandelion; dill; dock (sorrel); eggplant; endive (escarole); fennel, Florence (finocchio); forest seedlings; garland; garlic; gherkin; ginger; gourd; grape; grapefruit; hechima; herbs (all); honey balls; honeysuckle; hyotan; kale; kiwifruit (including: fuzzy and hard); kohlrabi; kumquat; leek; lemon; lettuce (including: head and leaf); lime; loquat; mandarin (including : tangerine and satsuma); mango; mayhaw; maypop;

melon (including: bitter melon, cantaloupe, hybrids and/or cultivars, citron melon, Crenshaw melon, golden pershaw melon, mango melon, honeydew melon, muskmelon, Persian melon, pineapple melon, Santa Claus melon, snake melon, watermelon);

mint; muntries; mustard; nectarine; nursery stock (fruit seedlings and rose bushes only); nursery tree crops (including crops like maple, ash, dogwood);

nut (including: almond, beech nut, cashew, chestnut, hickory nut, Brazil nut, macadamia nut (bush nut), filbert (hazelnut), pecan, pistachio, walnut (black and English/Persian); onion; orach; orange (including: sour an sweet); ornamentals; parsley; peas (including: English and garden); peach; peanut; pear (including: oriental and balsam); pepper; phalsa; plum (including: Chickasaw and Damson); plumcot; potato; prune (fresh); pummelo; pumpkin; purslane (including: garden and winter ); quince;

radicchio (red chicory); radish (including Oriental); rappini; rhubarb; rye; salal; sea buckthorn; soybean; spinach (including: New Zealand, Malabar, Indian); squash, (including: summer, winter, butternut, straightneck, Acorn, crookneck, hubbard, scallop, spaghetti); sugar beet; sweet potato; swiss chard; tangelo; tangor; tobacco; tomatoes; tree nuts (orchard replant only); turf (including golf courses); turnip; vegetable marrow; wheat; yams; zucchini.

Application with cement grinder and shredder equipment is prohibited. Open-pour applications are prohibited.

Use only according to label. Do not apply this product through any irrigation system unless the labeling on chemigation is followed.

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## GENERAL INSTRUCTIONS

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Sectagon 42 is a water-soluble liquid. When applied to properly prepared soil, the liquid is converted into a gaseous fumigant. After a sufficient waiting period, the gas dissipates, leaving the soil ready for planting. Sectagon 42 is recommended for the suppression of weeds, plant parasitic nematodes, and soilborne fungi that cause reductions in the yield and quality of ornamental, food and fiber crops.

Sectagon 42 will suppress only those pests in the fumigation zone at the time of treatment. Recontamination may occur subsequent to the fumigant's dissipation from the soil.

Weeds and germinating weed seeds that are suppressed include Annual bluegrass, Bermuda grass, Chickweed, Dandelion, Ragweed, Henbit, Lambsquarter, Amaranthus sp. (Pigweed, Careless weed), Watergrass, Johnsongrass, Nutgrass, Wild morningglory, Purslane, Barnyardgrass, Crabgrass, Groundsel, Prickly lettuce, Pineappleweed, Nettleleaf, Goosefoot, Nightshade, Shepherdspurse, Stinging nettle, Malva, London rocket, and Fiddleneck. The best weed suppression is obtained when Sectagon 42 is applied to weeds that are actively growing.

The soil-borne plant pathogenic fungi suppressed include species of Verticillium, Rhizoctonia, Pythium, Phytophthora, Sclerotinia.

The plant parasitic nematodes which Sectagon 42 suppresses include Root knot, Lesion, Dagger, Lance, Needle, Pin, Reniform, Stunt, Stubby root, Sting and Spiral.

**Note:** Sectagon 42 will only suppress nematodes that are in the fumigated zone at the time of treatment. The fumigated zone is defined as the depth of penetration that Sectagon 42 achieves at the time of application. In Oregon and Washington, Sectagon 42 will only suppress Miloidogyne Chitwoodi. Other pests suppressed include symphilitids or garden centipedes.

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## TREATMENT GUIDELINES

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For optimum results from soil fumigation with Sectagon 42 certain procedures should be observed at designated times in the treatment program. Described in this section are important guidelines for each of the four stages of the treatment process:

### Planning a Sectagon 42 Application

#### Preparing a Field for Application

#### Applying Sectagon 42

#### Preparing for Planting after Application of Sectagon 42

Your sales representative will help you select the best treatment program for your particular needs.

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## PLANNING A SECTAGON 42 APPLICATION

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### Time of Application

Apply Sectagon 42 after harvest and 14 to 21 days before a new crop is planted. In some

areas of North America, fall applications are preferred because the fumes dissipate over the winter, allowing planting to begin as soon as favorable springtime conditions arrive.

### Application Rate

Apply 1 to 75 gallons of Sectagon 42 per treated acre depending on crop, target pest, and soil properties. Soil properties to consider when determining the application rate include the depth of soil to be treated, soil texture and percent organic matter.

### Application in Tank Mix with Liquid Fertilizer

Sectagon 42 may be injected in a mixture with liquid fertilizers. Since the composition of liquid fertilizers vary considerably, the physical compatibility of each fertilizer/Sectagon 42 tank mix should be checked by using the following procedure:

Mix a small quantity of Sectagon 42 and liquid fertilizer in a glass container. Sectagon 42 and fertilizer should be mixed in the same ratio as they will be applied to the field (i.e., if 40 gallons of Sectagon 42 and 40 gallons of liquid fertilizer are to be applied per acre, then Sectagon 42 and fertilizer should be mixed in the jar in a 40:40 or 1:1 ratio). Agitate the liquids to attain a complete mixture.

If a uniform mix cannot be made, the mixture should not be used. If the mixture remains uniform for 30 minutes, the combination may be used. Should the mixture separate after 30 minutes, but readily remixes uniformly with agitation, the mixture can be used if adequate agitation is maintained in the tank.

DO NOT PLACE CAPS ON JAR, AS INCOMPATIBLE MIXES MAY EVOLVE HYDROGEN SULFIDE GAS.

USE PROMPTLY AFTER MIXING WITH WATER OR FERTILIZER. DO NOT ALLOW SOLUTION TO STAND.

Flush all equipment with water after each day's use. Disassemble valves and clean carefully.

### Target Pest and Depth of Treatment

For suppression of weeds and fungi causing seed or seedling diseases, treatment of only the top 1 to 4 inches of soil may be required (see application specific requirements in the Good Agricultural Practices section of this label). For suppression of nematodes and fungi which occur throughout the rhizosphere, treatment to depths of greater than 4 inches may be required. For a given soil type, the required application rate will increase proportionately with the depth of treatment required.

For example, if 25 gallons of Sectagon 42 per acre is required to treat 4 inches, then 50 gallons of Sectagon 42 will be required to treat to a depth of 8 inches. Choose the appropriate application method to distribute Sectagon 42 evenly throughout the soil to the required depth.

### Organic Matter in the Soil

Because of the absorbing effect of humus, soils with high levels of organic matter under the surface require higher than usual doses of Sectagon 42 with the maximum application rate being 75 gallons per acre. For example, muck soils require twice the amount of fumigant that would be used in mineral soils.

### Soil Texture

Application rates will vary with the soil texture. For instance, clay soils require more Sectagon 42 than light sandy soil.

### Soil Temperature During Treatment

At the time of fumigation, the soil temperature should be in the range of 40°F-90°F (4°-32°C).

### Phytotoxicity

Sectagon 42 is phytotoxic. Protect valuable, non-target plants by stopping soil applications of Sectagon 42 at least 3 feet short of the drip line of trees, shrubs, and other desirable plants. Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from nonuniform distribution of treated water.

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## APPLYING SECTAGON 42

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### Use of Diluted Sectagon 42

Do not store the diluted product. Use Sectagon 42 promptly after it has been mixed

with water. In dilute solutions in water Sectagon 42 decomposes over a period of days. Although Sectagon 42 is stable in its concentrated form, it is unstable in acid dilutions.

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## CHEMIGATION—GENERAL PROCEDURES

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When applying by chemigation methods the following precautions must be observed.

Apply this product only through sprinkler including center pivot, lateral move, end tow, side (wheel) roll, traveler, big gun solid set, or hand move; flood (basin); furrow; border, or drip (trickle) irrigation systems. Do not apply this product through any other type of irrigation system.

Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from nonuniform distribution of treated water.

If you have questions about calibration, you should contact State Extension Service specialists, equipment manufacturers or other experts.

Do not connect an irrigation system used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place.

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.

### CHEMIGATION SYSTEMS CONNECTED TO PUBLIC WATER SYSTEMS

**NOTE:** Tessengerlo Kerley, Inc. does not encourage connection of chemigation systems to public water systems. The following information is provided for users who have evaluated all alternative application and water source options before choosing to make such a connection.

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. Chemigation systems connected to public water systems must contain a functional, reduced-pressure zone, backflow preventer (RPZ) or the functional equivalent in the water supply line upstream from point of pesticide introduction. As an option to the RPZ, the water from the public water system should be 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 the top or overflow rim of the reservoir tank measuring of at least twice the inside diameter of the fill pipe.

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

### GENERAL INSTRUCTIONS FOR SPRINKLER SYSTEMS

**NOTICE:** Do not operate irrigation systems without safety valves or other devices to prevent back siphoning of Sectagon 42 into water sources. Irrigation water treated with Sectagon 42 should be maintained on the treated area until the water is absorbed by the soil. The tank containing Sectagon 42 must be connected to the discharge side of the irrigation pump or other pressurized equipment attached to the irrigation line. Do not apply in irrigation systems that result in overlapping application of Sectagon 42. Do not apply when weather conditions favor drift from target areas.

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## PREPARING FOR PLANTING AFTER APPLICATION OF SECTAGON 42

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### Effect of Rain

If a Sectagon 42 application is rained on less than 24 hours after treatment, lack of suppression at and near the soil surface may result.

### Recontamination

Precautions must be taken to prevent recontamination of treated soil with weed seeds, plant pathogenic fungi and plant parasitic nematodes. Use clean seeds and/or plants. Before farm equipment is driven into the treated area, it should be rinsed free of the untreated soil from other fields.

### Interval Between Treatment and Planting

Because Sectagon 42 can be harmful to germinating and/or living plants, an appropriate interval must be observed between soil fumigation and planting. On well-drained soils which have a light to medium texture and which are not excessively wet or cold following

application, planting can begin 14 to 21 days after treatment. If soils are heavy or especially high in organic matter, or if they remain wet and or cold (below 60°F or 15°C) following application, a minimum interval of 30 days should be observed.

### Aeration before planting

Soils including soils high in clay or organic matter, should be allowed to aerate and dry thoroughly after treatment with Sectagon 42. During cold and/or wet weather, frequent shallow cultivation can aid the escape of Sectagon 42 from the soil.

### Testing for Dissipation of Sectagon 42

After the waiting period has passed, if there are any questions about the complete escape of Sectagon 42 from the soil, transplant a seedling into the treated soil. If the plant develops normally without any signs of chemical injury, crop planting can begin.

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## USES, APPLICATION METHODS & RATES

### FIELD APPLICATION WHERE ENTIRE AREA IS BEING TREATED

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#### POWER ROLL SEAL METHOD (NON-TARP)

Use a RO-TO-VATE & ROLL Applicator only. Contact your local agricultural extension service, distributor or the manufacturer for approved RO-TOVATE & ROLL Application specifications.

**When to Treat:** Apply Sectagon 42 2 to 6 weeks prior to planting, whenever soil type and conditions permit. For best results with annual crops, treat the soil each year. Do not use Sectagon 42 to treat any type of soil when it is cold and/or wet (when soil is colder than 40°F or contains more moisture than 80% field capacity).

**Application:** Use undiluted Sectagon 42 to the desired depth below the final soil surface. (Contact your dealer or the manufacturer for the specifications for suitable application equipment).

#### IMPORTANT SOIL TREATMENT PRECAUTIONS

**Crops to be hilled:** For crops that require soil movement (hilling) prior to or after planting, incorporate Sectagon 42 to a depth that will allow the tillage required to occur without penetrating below the depth of treatment (see application specific requirements in the Good Agricultural Practices section of this label).

**Crops to be bedded:** For crops to be bedded, care must be taken that exposed sides of raised beds are not cracked or open compared to the power rolled surface. If necessary, add power rollers of the required height or other sealing equipment to the ends of the bedding equipment to seal the sides.

**Note:** The use of Sectagon 42 for the suppression of weeds, weed seeds and shallow inhabiting soil fungi requires that NO SOIL CULTIVATION OCCUR FOLLOWING TREATMENT until time of planting.

This method of treating soil with Sectagon 42 will not be effective for the suppression of nematodes outside the treated zone. This method of Sectagon 42 application can be used in combination with other soil fumigants to suppress the nematodes persisting in the surface 1 to 6 inches of soil normally not suppressed with injected soil fumigants.

Zone of treatment will be limited by diameter of applicator. If pest is deeper than applicator can treat to, use a different method. For further information contact your local agricultural extension service or the manufacturer.

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## SOIL INJECTION

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Use injectors (shanks, blades, fertilizer wheels, plows, etc.) to apply Sectagon 42 at the rate of 15 to 75 gallons per acre into well prepared soil. Follow immediately with a bedshaper, roller press wheel, or similar device, or cover with an adequate amount of soil to seal the fumigant into the soil.

Example: apply through injectors placed 4 inches below surface and 5 inches apart.

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## SPRINKLER SYSTEM

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Use only those sprinkler systems which give large water droplets to prevent excess loss. Use 37.5 to 75 gallons Sectagon 42 per acre for suppression of nematodes and fungi at a depth of 24 inches. For suppression of weeds and fungi at a depth of 8 inches or

less, use 15 to 75 gallons per acre. Inject the Sectagon 42 in enough water to reach to desired treatment depth. The product should be continuously metered into the irrigation system throughout the entire application period. Flush the system with only enough water to clear lines. If the soil surface dried quickly, reseal it with 15 minutes of water once a day for the next day or two.

To prevent runoff of treatment solution during sprinkler application, do not exceed the infiltration rate of the solution into the soil. Should runoff occur, isolate it from growing crops and water sources. Once collected, reapply it to the treated area. See use precautions in "CHEMIGATION" section.

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### CHECK OR FLOOD IRRIGATION

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Meter Sectagon 42 at a steady rate into water during irrigation. Use 40 to 75 gallons of Sectagon 42 per acre, depending upon the kind of pest and depth desired, in 3 to 18 inches of water per acre. See use precautions in "CHEMIGATION" section.

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### DISC APPLIED METHOD

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Spray Sectagon 42 immediately in front of disc. Use 15 to 75 gallons per acre. Follow immediately with a roller to smooth and compact the soil surface.

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### DRIP IRRIGATION

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Sectagon 42 may be injected into drip irrigation systems prior to planting. The area must be calculated in accordance with the size of the band treated. Apply 40 gallons per broadcast acre in one acre inch of water (27,000 gallons). The resulting concentration is 700 ppm on a weight basis. (Example: if the emitters irrigate 10% of each acre then use 5 gallons Sectagon 42 in 2,700 gallons water). Inject continuously. Do not slug treat. See use precautions in "CHEMIGATION" section.

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### APPLICATION TO BED OR ROWS

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#### POWER ROLL SEAL METHOD (NON-TARP)

Use a modified RO-TO-VATE & ROLL Applicator only. Contact your local agricultural extension service, distributor or the manufacturer for approved RO-TO-VATE & ROLL Applicator specifications.

**When to treat:** Apply Sectagon 42 2 to 6 weeks prior to planting whenever soil type and conditions permit. For best results with annual crops, treat the soil each year. Do not use Sectagon 42 to treat any type of soil when it is cold and/or wet (when soil is colder than 40°F or contains more moisture than 80% field capacity).

**Application:** Use undiluted Sectagon 42 Apply with suitable application equipment that will ensure incorporation of Sectagon 42 to the desired depth below the final soil surface. (Contact your dealer or the manufacturer for the specifications for suitable application equipment).

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### IMPORTANT SOIL TREATMENT PRECAUTIONS

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**Crops to be hilled:** For crops that require soil movement (hilling) prior to or after planting, incorporate Sectagon 42 to a depth that will allow the tillage required to occur without penetrating below the depth of treatment (see application specific requirements in the Good Agricultural Practices section of this label).

**Crops to be bedded:** For crops to be bedded, care must be taken that exposed sides of raised beds are not cracked or open compared to the power rolled surface. If necessary, add power rollers of the required height or other sealing equipment to the ends of the bedding equipment to seal the sides.

**Note:** The use of Sectagon 42 for the suppression of weeds, weed seeds and shallow inhabiting soil fungi requires that NO SOIL CULTIVATION OCCUR FOLLOWING TREATMENT until time of planting.

This method of treating soil with Sectagon 42 will not be effective for the suppression of nematodes outside the treated zone. This method of Sectagon 42 application can be used in combination with other soil fumigants to suppress the nematodes persisting in

the surface 1 to 6 inches of soil normally not suppressed with injected soil fumigants.

Zone of treatment will be limited by diameter of applicator. If pest is deeper than applicator can treat to, use a different method. For further information contact your local agricultural extension service or the manufacturer.

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### SOIL INJECTION

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Sectagon 42 at the rate of 50 to 75 gallons per treated acre (1 to 1.5 pints per 100 sq. ft.), may be injected into preformed plant beds following the directions given above under soil injection. If a wider treated band is desired, space 2 or more injectors (shanks, blades, fertilizer wheels, etc.) at desired intervals to cover the desired treating width. Seal immediately.

If Sectagon 42 is injected into established plant beds to terminate growth of a previous crop, and to fumigate the bed in preparation for planting a subsequent crop, the terminated crop should not be used for any food or feed purposes after Sectagon 42 has been applied.

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### SOIL COVERING METHOD (BED-OVER METHOD)

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Sectagon 42 may be sprayed or dripped onto the soil immediately ahead of bed-shaping equipment. Follow immediately with a bedshaper, roller press wheel, or similar device, or cover with an adequate amount of soil to seal the fumigant into the soil. The recommended rate of Sectagon 42 is 40 to 75 gallons per acre of treated soil, approximately equivalent to .5 to 1.5 pints per 100 linear ft. of 12-inch wide row.

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### DRIP IRRIGATION

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During pre-irrigation, check drip tape for uniform distribution and repair if necessary. Apply 15 to 75 gallons Sectagon 42 per treated acre (0.25 to 1.5 pints per 100 sq. ft. of treated soil) using enough water to thoroughly wet entire desired treatment zone. During the entire irrigation period, inject Sectagon 42 continuously into drip line as close as possible to treatment area. Two or more lines per bed may be needed to ensure full coverage.

Application must be continuously supervised. Weed suppression will not be satisfactory if too much water is applied (if 80% field capacity is exceeded). An adequate concentration of Sectagon 42 must be present at the time of weed seed germination in order to be effective. See use precautions in "CHEMIGATION" section.

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### DRENCH METHOD

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Sectagon 42 may be applied to finished beds in enough water to soak at least 2 inches deep for suppression of shallow seeded weeds. To avoid contamination by untreated soil, do not disturb the treated area. Apply 15 to 75 gallons of Sectagon 42 per treated acre.

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### ADDITIONAL RECOMMENDATIONS

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#### TOBACCO PLANT BEDS

Fall applications are recommended wherever possible. Read and follow DIRECTIONS FOR USE carefully. Treatment in the South should generally be made before November 30.

**DRENCH METHOD:** Apply 2 gallons Sectagon 42 in 150 to 200 gallons of water per 100 sq. yd. Application may be made with sprinklers, sprayers with nozzles or any suitable equipment. Follow directions given above for seed bed treatment.

#### SYMPHYLID SUPPRESSION

Soil should be in good seed bed condition to a depth of 8 to 10 inches. Maintain adequate moisture during spring season. Treat during July-August when symphylids are in the upper soil surface. Apply 15 gallons Sectagon 42 per acre using blade or chisel injector. Inject below level of symphylid concentration, usually 6 to 8 inches. Pack soil immediately after application.

**NOTE:** Sectagon 42 will only suppress nematodes which are in the fumigated zone at

the time of treatment.

## POTATOES

For suppression of potato pests such as Root knot nematodes, Weed seeds, *Verticillium dahliae* (Early maturity disease).

Apply 30 to 75 gallons Sectagon 42 per acre using injectors (shanks, blades, fertilizer wheels, plows, etc.) Follow immediately with a bedshaper, roller press wheel or similar device or cover with an adequate amount of soil to seal the fumigant into the soil.

**Sprinkler system preplant application** – Use 37.5 to 75 gallons of Sectagon 42 per acre. Inject into a sprinkler system that can deliver an even water distribution for the area being treated. Inject all of the Sectagon 42 needed for the area covered and apply in enough water to reach the desired treatment depth. Soil temperature should be in the range of 40°F to 90°F in the treatment zone. Soil moisture immediately prior to treatment must be 60 to 80% of field capacity down to 24" level. Soil condition must facilitate even moisture penetration without runoff. Do not apply when plants are present. See use precautions in "CHEMIGATION" section.

**NOTE:** Sectagon 42 will suppress Root knot nematodes in the fumigated zone at the time of treatment. The fumigated zone is defined as the depth of penetration that Sectagon 42 achieves at the time of application.

If high numbers or deep nematodes are identified, anticipate nematodes to build up throughout the growing season. Some damage will occur unless additional action is taken.

Sectagon 42 has no soil residual and reinfestation of a field can occur from numerous sources such as deep nematode populations, seed pieces, irrigation water, equipment contamination and blowing wind.

## EARLY MATURITY DISEASES OF POTATOES IN OREGON

Apply 30 gallons Sectagon 42 per acre using injectors (shanks, blades, fertilizer wheels, plows, etc.) Follow immediately with a bedshaper, roller press wheel or similar device or cover with an adequate amount of soil to seal the fumigant into the soil.

**NOTE:** Sectagon 42 will suppress Root knot nematodes in the fumigated zone at the time of treatment. The fumigated zone is defined as the depth of penetration that Sectagon 42 achieves at the time of application.

## MINT

*Verticillium* wilt control.

When infestation is limited to small spots in a field, spread can be reduced by treating the soil with 75 gallons Sectagon 42 per treated acre (1½ pints per 100 sq. ft.) using injector blade or thin shank injector rig with injectors spaced at intervals to cover the desired treating width.

## WHEAT AND BARLEY

For suppression of certain root diseases caused by Early season soil fungi – before applying Sectagon 42 cultivate the area to be treated to break up clods. Apply 2 to 7.5 gallons per treated acre 14 to 21 days before planting. Sectagon 42 may be diluted with water or non-acidic liquid fertilizer immediately before applying. Inject Sectagon 42 to a depth of 5 to 8 inches into moist soil. Space injector shanks at intervals to cover the desired treating width.

Do not mix Sectagon 42 with acidic fertilizer or other acidic solutions. Use only in areas which receive 15 or more inches of rainfall per year.

## PEANUTS

Cylindrocladium Black Rot (CBR) Suppression:

Apply Sectagon 42 at the following rates:

**CBR-resistant cultivar (NC8C):** 7.5 gallons per treated acre or 4 pints per 1,000 feet of treated row CBR-susceptible peanut cultivars (Floriant, GK-3, NC-5 Keel 29): 15 gallons per treated acre or 8 pints per 1,000 feet of treated row.

**CBR-highly susceptible cultivars (VA 81B, NC7):** use of Sectagon 42 is not recommended.

**Soil Preparation:** Before applying Sectagon 42 residue from the previous crop should be decomposed (enhanced by fall discing) and plowed under in the spring with mold-board plow. Soil incorporated preplant herbicides must be applied before application of

Sectagon 42.

**Application:** Apply Sectagon 42 with a gravity flow regulator through chisel-type or counter-type applicators. Center each applicator, one per row, in front of a bedshaper to mark the location of chemical deposition. Sectagon 42 should be deposited 6 to 8 inches below the soil surface of beds. Bed and applicator spacing should coincide with row spacing at planting. Soil temperatures must be in the range of 60°F to 90°F at injection depth before application.

**Tillage and Planting after Application:** Do not mix treated soil with untreated soil by tillage or other cultural practices. Plant peanuts in the center of treated beds no earlier than 14 days following application of Sectagon 42. An at-planting nematicide treatment will be necessary in fields with heavy infestation of Root knot, Ring and/or String nematode.

## FOR SUPPRESSION OF SPECIFIC ORCHARD DISEASES (SUCH AS SPECIFIC APPLE REPLANT DISEASE)

Use 62 to 75 gallons of Sectagon 42 per treated acre. It is best to have the replant site prepared to a planting consistency which includes irrigating to 70% field capacity before Sectagon 42 application. Treatment can be made in the Fall or Spring before planting but Fall application is the preferred timing. Spring application can be riskier because the interval between treatment and planting is critical; see CAUTIONS listed below. Do not harvest fruit within one (1) year of application.

There are three application techniques that may be used: 1) Entire orchard site, 2) Individual tree row site, and 3) Individual tree plant site.

**Entire orchard site:** Inject the desired amount of Sectagon 42 into a sprinkler system to treat the entire replant site. Figure the irrigation schedule required to cover the desired treatment depth. Start the irrigation system and inject the Sectagon 42 one-third to one-half way through the cycle making sure to leave enough time at the end of the cycle to seal the application with plain water.

**Individual tree row site:** Two methods of application may be used to apply Sectagon 42 to individual tree row sites: Method One is to apply Sectagon 42 through a portable irrigation system such as a sprinkler or drip system; Method Two is to apply the desired amount of Sectagon 42 through a weed sprayer while the irrigation system is running. For either method and after identifying the position of the future tree row site, apply Sectagon 42 one-third to one-half way through the required irrigation cycle leaving enough time at the end of the cycle to apply plain water, sealing the Sectagon 42 in the ground.

**Individual tree plant site:** Use 18 to 24 fluid ounces of Sectagon 42 per 100 gallons of water. Use 16 gallons of this solution in a 4 by 4 foot planting hole. Water and product amount adjustments can be made to accommodate different size planting holes to ensure product movement to desired depth. Replace dirt removed.

**TARPING:** Tarping of replant sites is required when near (1/2 mile) to populated areas, such as schools, hospitals, commercial or office buildings, factories, residential areas, etc. Tarping is not required if treatment is farther than 1/2 mile from such populated areas.

## CAUTIONS: INTERVAL BETWEEN TREATMENT AND PLANTING

Because Sectagon 42 is harmful to living plants, an appropriate interval must be observed between Sectagon 42 application and planting. On well-drained soils which have a light to medium texture and are not excessively wet or cold following application, planting can begin 21 to 30 days after treatment. If soils are heavy or especially high in organic matter or if they remain wet and/or cold (below 60 degrees F) following application, a minimum interval of 30 to 45 days should be observed. Where the dosage approaches the 75 gallons per acre rate, wait at least 60 days.

HARVEST OF ANY FRUIT WITHIN ONE (1) YEAR OF TREATMENT IS PROHIBITED.

## Conditions of Sale and Warranty

### CONDITIONS OF SALE – LIMITED WARRANTY AND LIMITATIONS OF LIABILITY AND REMEDIES

The directions on this label are believed to be reliable and must be followed carefully. Insufficient control of pests and/or injury to the crop to which the product is applied may result from the occurrence of extraordinary or unusual weather conditions, or the failure to follow the label directions, or good application practices, all of which are beyond the control of Tessenderlo Kerley, Inc., or seller. In addition, failure to follow label directions may cause injury to crops, animals, man or the environment. Tessenderlo Kerley, Inc. warrants that this product conforms to the chemical description on the label and is reasonably fit for the purpose referred to in the directions for use, subject to the factors noted above which are beyond the control of Tessenderlo Kerley, Inc. Except as warranted by this label, Tessenderlo Kerley, Inc. makes no other warranties or representations of any kind, express or implied, concerning the product, including no implied warranty of merchantability or fitness for any particular purpose. To the extent consistent with applicable law, the exclusive remedy against Tessenderlo Kerley, Inc. for any cause of action relating to the handling or use of this product is a claim of damage, and in no event shall damages or any other recovery of any kind against Tessenderlo Kerley, Inc. exceed the price of the product which causes the alleged loss, damage, injury, or other claim. To the extent allowed by applicable law, Tessenderlo Kerley, Inc. shall not be liable and any and all claims against Tessenderlo Kerley, Inc. are waived, for special, indirect, incidental or consequential damages or expense of any nature, including, but not limited to, loss of profits or income, whether or not based on the negligence of Tessenderlo Kerley, Inc., breach of warranty, strict liability in tort, or any other cause of action. Tessenderlo Kerley, Inc. and the seller offer this product, and the buyer and users accept it, subject to the foregoing conditions of sale and limitations of warranty, liability and remedies.

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