

## Chloropicrin (sole active ingredient) Field Fumigation Methods Allowed

California Code of Regulations, Chapter 3, Section 6449.1

Regulations to reduce emissions of volatile organic compounds (VOCs) from fumigant pesticides became effective on January 25, 2008. The rules focus on field fumigant applications made between May 1 and October 31 in five “nonattainment areas” (NAAs) that do not meet federal air quality standards for pesticide VOC emissions. Application method requirements depend on:

- When the fumigant will be applied, and
- Where the fumigant will be applied.

**Between November 1 and April 30, there is no change.** Any field fumigant method previously allowed can be used, anywhere in California. (Regulations and permit conditions that already restricted the use of some fumigants still apply.)

**Throughout the year, in areas outside the five NAAs there is no change.** Any field fumigant method previously allowed can be used, anywhere in California. (Regulations and permit conditions that already restricted the use of some fumigants still apply.)

**In the five NAAs,** from May 1 to October 31, field fumigations are limited to specific methods listed in the regulations. (For a map of the NAAs and a list of geographic sections affected by the field fumigant regulations, go to [http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/em\\_region.htm](http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/em_region.htm).)

### Key to abbreviations:

**SAC** Sacramento Metro (All of Sacramento and Yolo, parts of El Dorado, Placer, Solano, Sutter counties)

**SC** South Coast (All of Orange, parts of Los Angeles, Riverside, San Bernardino)

**SJV** San Joaquin Valley (All of Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare, parts of Kern)

**SED** Southeast Desert (Parts of Los Angeles, Riverside, San Bernardino)

**VEN** Ventura (all of Ventura)

**Method:** Nontarpaulin/Shallow/Bed

**Method Code:** 1101

**Emission Rating:** 64%

**Method allowed (X) in these NAAs (May 1 –October 31):**

SAC SC SJV SED VEN

× ×

### Method Description:

- Rearward-curved (swept-back) chisels shall be used with:
  - closing shoes and bed-shaper, or closing shoes and compaction roller; and chisel injection points positioned beneath and ahead of the closing shoes.
- Injection depth shall be 10 inches. The injection depth to preformed beds must not be below the bed furrow.
- Injection spacing shall be 40 inches.
- Soil shall not be disturbed for at least three days (72 hours) following completion of injection to the application beds.

**Chloropicrin (sole active ingredient) Field Fumigation Methods Allowed**  
California Code of Regulations, Chapter 3, Section 6449.1

<p><b>Method:</b> Nontarpaulin/Deep/Broadcast</p> <p><b>Method Allowed (X) in NAA (May 1 –October 31):</b> SAC SC SJV SED VEN X X</p> <p><b>Method Description:</b></p> <ul style="list-style-type: none"><li>• Forward-curved chisel shall be used with:<ul style="list-style-type: none"><li>▪ an injection depth shall be 20 inches; or</li><li>▪ closing shoes and compaction roller and the injection depth shall be 24 inches.</li></ul></li><li>• Injection spacing shall be 68 inches or less.</li><li>• Soil shall not be disturbed for at least four days following completion of injection.</li></ul>	<p><b>Method Code:</b> 1102 <b>Emission Rating:</b> 64%</p>
<p><b>Method:</b> Tarpaulin/Shallow/Broadcast - Nobel Plow</p> <p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b> SAC SC SJV SED VEN X X X X X</p> <p><b>Method Description:</b></p> <ul style="list-style-type: none"><li>• Application shall be made using either:<ul style="list-style-type: none"><li>▪ An application tractor equipped with an air fan dilution system, and with a plow consisting of horizontal v-shaped blades mounted by a vertical arm to the tool bar. The fumigant shall be injected laterally beneath the soil surface; or</li><li>▪ Rearward-curved (swept-back) chisels, closing shoes, and compaction roller shall be used.</li></ul></li><li>• Injection depth shall be at least 10 inches and no greater than 15 inches.</li><li>• Injection spacing shall be at 12 inches or less.</li><li>• The tarpaulin shall be laid down simultaneously (with fumigant injection) by tarpaulin-laying equipment mounted on the application tractor.</li><li>• Tarpaulin shall not be cut until a minimum of 5 days (120 hours) following of injection to the application block. The tarpaulin shall be cut pursuant to 3 CCR section 6784(b)(4).</li></ul>	<p><b>Method Code:</b> 1103 <b>Emission Rating:</b> 44%</p>

**Chloropicrin (sole active ingredient) Field Fumigation Methods Allowed**  
California Code of Regulations, Chapter 3, Section 6449.1

<p><b>Method:</b> Tarpaulin/Shallow/Broadcast - Nobel Plow-Strip</p> <p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b> SAC SC SJV SED VEN X X</p> <p><b>Method Description:</b></p> <ul style="list-style-type: none"><li>• Application shall be made using either:<ul style="list-style-type: none"><li>▪ An application tractor equipped with an air fan dilution system, and with a plow consisting of horizontal v-shaped blades mounted by a vertical arm to the tool bar. The fumigant shall be injected laterally beneath the soil surface; or</li><li>▪ Rearward-curved (swept-back) chisels, closing shoes, and compaction roller shall be used.</li></ul></li><li>• Injection depth shall be at least 10 inches and no greater than 15 inches.</li><li>• Injection spacing shall be at 12 inches or less.</li><li>• The tarpaulin shall be laid down simultaneously (with fumigant injection) by tarpaulin-laying equipment mounted on the application tractor.</li><li>• Tarpaulin shall not be cut until a minimum of 5 days (120 hours) following of injection to the application block. The tarpaulin shall be cut pursuant to 3 CCR section 6784(b)(4).</li></ul>	<p><b>Method Code:</b> 1104 <b>Emission Rating:</b> 64%</p>
<p><b>Method:</b> Tarpaulin/Shallow/Broadcast Closing shoes &amp; compaction roller</p> <p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b> SAC SC SJV SED VEN X X</p> <p><b>Method Description:</b></p> <ul style="list-style-type: none"><li>• Application shall be made using either:<ul style="list-style-type: none"><li>▪ An application tractor equipped with an air fan dilution system, and with a plow consisting of horizontal v-shaped blades mounted by a vertical arm to the tool bar. The fumigant shall be injected laterally beneath the soil surface; or</li><li>▪ Rearward-curved (swept-back) chisels, closing shoes, and compaction roller shall be used.</li></ul></li><li>• Injection depth shall be at least 10 inches and no greater than 15 inches.</li><li>• Injection spacing shall be at 12 inches or less.</li><li>• The tarpaulin shall be laid down simultaneously (with fumigant injection) by tarpaulin-laying equipment mounted on the application tractor.</li><li>• Tarpaulin shall not be cut until a minimum of 5 days (120 hours) following completion of injection to the application block. The tarpaulin shall be cut pursuant to 3 CCR section 6784(b)(4).</li></ul>	<p><b>Method Code:</b> 1105 <b>Emission Rating:</b> 64%</p>

**Chloropicrin (sole active ingredient) Field Fumigation Methods Allowed**  
California Code of Regulations, Chapter 3, Section 6449.1

<p><b>Method:</b> Tarpaulin/Shallow/Bed</p> <p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b></p> <table><tr><td>SAC</td><td>SC</td><td>SJV</td><td>SED</td><td>VEN</td></tr><tr><td style="text-align: center;">✗</td><td style="text-align: center;">✗</td><td></td><td></td><td></td></tr></table> <p><b>Method Description:</b></p> <ul style="list-style-type: none"><li>• Rearward-curved (swept-back) chisels shall be used with either:<ul style="list-style-type: none"><li>▪ Closing shoes and compaction roller. The closing shoes shall cover the chisel marks with soil just ahead of the compaction roller, and the tarpaulin shall be laid down simultaneously (with fumigant injection) by tarpaulin-laying equipment mounted on the application tractor; or</li><li>▪ Bed shaper. The chisels shall be placed with the injection point under the bed shaper, and the tarpaulin shall be laid down simultaneously (with fumigant injection) by tarpaulin-laying equipment mounted on the application tractor; or</li><li>▪ Combination bed former and bed shaper. The chisels shall be placed between the bed former and the bed shaper. The tractor with the tarpaulin-laying equipment shall immediately follow the application tractor.</li></ul></li><li>• Injection depth shall be 6 inches. The injection depth to preformed beds must not be below the bed furrow.</li><li>• Injection spacing shall be 12 inches.</li><li>• The tarpaulin shall be cut five days (120 hours) following completion of injection to the application block.</li></ul>	SAC	SC	SJV	SED	VEN	✗	✗				<p><b>Method Code:</b> 1106</p> <p><b>Emission Rating:</b> 64%</p>
SAC	SC	SJV	SED	VEN							
✗	✗										
<p><b>Method:</b> Tarpaulin/Deep/Broadcast</p> <p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b></p> <table><tr><td>SAC</td><td>SC</td><td>SJV</td><td>SED</td><td>VEN</td></tr><tr><td style="text-align: center;">✗</td><td style="text-align: center;">✗</td><td style="text-align: center;">✗</td><td style="text-align: center;">✗</td><td style="text-align: center;">✗</td></tr></table> <p><b>Method Description:</b></p> <ul style="list-style-type: none"><li>• Forward-curved chisels shall be used with either:<ul style="list-style-type: none"><li>▪ An air fan dilution system on the application tractor; or</li><li>▪ Closing shoes and compaction roller.</li></ul></li><li>• Injection depth shall be at least 20 inches.</li><li>• Injection spacing shall be 66 inches or less.</li><li>• The tarpaulin shall be laid down simultaneously (with fumigant injection) by tarpaulin-laying equipment mounted on the application tractor.</li><li>• Tarpaulin shall not be cut until at least five days (120 hours) following completion of injection to the application block. The tarpaulin shall be cut pursuant to 3CCR section 6784(b)(4).</li></ul>	SAC	SC	SJV	SED	VEN	✗	✗	✗	✗	✗	<p><b>Method Code:</b> 1107</p> <p><b>Emission Rating:</b> 44%</p>
SAC	SC	SJV	SED	VEN							
✗	✗	✗	✗	✗							

**Chloropicrin (sole active ingredient) Field Fumigation Methods Allowed**  
California Code of Regulations, Chapter 3, Section 6449.1

<p><b>Method:</b> Tarpaulin/Deep/Broadcast - Strip</p>	<p><b>Method Code:</b> 1108</p>
<p><b>Emission Rating:</b> 64%</p>	
<p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b></p>	
<p>SAC SC SJV SED VEN</p>	
<p align="center">X X</p>	
<p><b>Method Description:</b></p>	
<ul style="list-style-type: none"> <li>• Forward-curved chisels shall be used.</li> <li>• Injection depth shall be at least 20 inches.</li> <li>• Injection spacing shall be 66 inches or less.</li> <li>• The tarpaulin shall be laid down simultaneously (with fumigant injection) by tarpaulin-laying equipment mounted on the application tractor.</li> <li>• Tarpaulin shall not be cut until at least five days (120 hours) following completion of injection to the application block. The tarpaulin shall be cut pursuant to 3CCR section 6784(b)(4).</li> </ul>	
<p><b>Method:</b> Nontarpaulin/Shallow/Broadcast or Bed</p>	<p><b>Method Code:</b> 1201</p>
<p><b>Emission Rating:</b> 64%</p>	
<p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b></p>	
<p>SAC SC SJV SED VEN</p>	
<p align="center">X X</p>	
<p><b>Method Description:</b></p>	
<ul style="list-style-type: none"> <li>• Injection point must be at least 12 inches below the soil surface.</li> <li>• Chisel trace must be eliminated by use of tillage equipment to mix the soil to a depth of at least three inches. Broadcast fumigation must be followed by compaction of the soil surface.</li> </ul>	
<p><b>Method:</b> Tarpaulin/Shallow/Broadcast</p>	<p><b>Method Code:</b> 1202</p>
<p><b>Emission Rating:</b> 44%</p>	
<p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b></p>	
<p>SAC SC SJV SED VEN</p>	
<p align="center">X X X X X</p>	
<p><b>Method Description:</b></p>	
<ul style="list-style-type: none"> <li>• Injection point must be at least 12 inches below the soil surface.</li> <li>• Chisel trace must be eliminated by use of tillage equipment to mix the soil to a depth of at least three inches. Broadcast fumigation must be followed by compaction of the soil surface.</li> <li>• Tarpaulins must be buried under at least four inches of firmly packed soil at the end of the rows.</li> <li>• The operator of the property shall maintain a “tarpaulin repair response plan’ pursuant to subsection (d)</li> </ul>	

**Chloropicrin (sole active ingredient) Field Fumigation Methods Allowed**  
California Code of Regulations, Chapter 3, Section 6449.1

<b>Method:</b> Tarpaulin/Shallow/ Bed	<b>Method Code:</b> 1203 <b>Emission Rating:</b> 64%
<b>Method allowed (X) in these NAAs (May 1 –October 31):</b> SAC SC SJV SED VEN X X	
<b>Method Description:</b> <ul style="list-style-type: none"><li>• Injection point must be at least 12 inches below the soil surface.</li><li>• Chisel trace must be eliminated by use of tillage equipment to mix the soil to a depth of at least three inches. Broadcast fumigation must be followed by compaction of the soil surface.</li><li>• Tarpaulins must be buried under at least four inches of firmly packed soil at the end of the rows.</li><li>• The operator of the property shall maintain a “tarpaulin repair response plan’ pursuant to subsection (d)</li></ul>	
<b>Method:</b> Nontarpaulin/Shallow/Broadcast or Bed Three Post-Fumigation Water Treatments	<b>Method Code:</b> 1204 <b>Emission Rating:</b> 43%
<b>Method allowed (X) in these NAAs (May 1 –October 31):</b> SAC SC SJV SED VEN X X X X X	
<b>Method Description:</b> <ul style="list-style-type: none"><li>• Injection point must be at least 12 inches below the soil surface.</li><li>• Chisel trace must be eliminated by use of tillage equipment to mix the soil to a depth of at least three inches. Broadcast fumigation must be followed by compaction of the soil surface.</li><li>• Fumigation must be completed in a time that allows compliance with the post-fumigation water treatments below:<ul style="list-style-type: none"><li>▪ Water must be applied by an irrigation method that uniformly covers the treated area in the entire application block.</li><li>▪ On the day of fumigation, the first water treatment must consist of at least 0.20 inches of water, beginning within 30 minutes of the completion of fumigation. A second post-fumigation water treatment must consist of at least 0.20 inches of water applied starting no earlier than one hour prior to sunset on the day of fumigation and completed by midnight.</li><li>▪ On the day following fumigation, a third post-fumigation water treatment must consist of at least 0.20 inches of water, and must be applied starting no earlier than one hour prior to sunset and completed by midnight.</li><li>▪ Additional post-fumigation water treatment(s) may be applied at any time provided the treatments required above are completed in the specified time periods.</li></ul></li></ul>	

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California Code of Regulations, Chapter 3, Section 6449.1

**Method:** Tarpaulin/Shallow/Bed  
Three Post-Fumigation Water Treatments

**Method Code:** 1205  
**Emission Rating:** 43%

**Method allowed (X) in these NAAs (May 1 –October 31):**

SAC	SC	SJV	SED	VEN
✗	✗	✗	✗	✗

**Method Description:**

- Injection point must be at 12 inches below the soil surface.
- Chisel trace must be eliminated by use of tillage equipment to mix the soil to a depth of at least three inches.
- Tarpaulins must be buried under at least four inches of firmly packed soil at the ends of the rows.
  - Fumigation must be completed in a time that allows compliance with the post-fumigation water treatments below:
  - Water must be applied by an irrigation method that uniformly covers the treated area in the entire application block.
  - On the day of fumigation, the first water treatment must consist of at least 0.20 inches of water to the untarped areas, beginning within 30 minutes of the completion of fumigation. A second post-fumigation water treatment must consist of at least 0.20 inches of water to the untarped areas applied starting no earlier than one hour prior to sunset on the day of fumigation and completed by midnight.
  - On the day following fumigation, a third post-fumigation water treatment must consist of at least 0.20 inches of water to the untarped areas, and must be applied starting no earlier than one hour prior to sunset and completed by midnight.
  - Additional post-fumigation water treatment(s) may be applied at any time provided the treatments required above are completed in the specified time periods.
- The operator of the property shall maintain a "tarpaulin repair response plan" pursuant to subsection (d).

**Method:** Nontarpaulin/Deep/Broadcast or Bed

**Method Code:** 1206  
**Emission Rating:** 64%

**Method allowed (X) in these NAAs (May 1 –October 31):**

SAC	SC	SJV	SED	VEN
✗	✗			

**Method Description:**

- Injection point must be at least 18 inches below the soil surface.
- Chisel trace must be eliminated by use of tillage equipment to mix the soil to a depth of at least three inches. Broadcast fumigation must be followed by compaction of the soil surface.

**Chloropicrin (sole active ingredient) Field Fumigation Methods Allowed**  
California Code of Regulations, Chapter 3, Section 6449.1

<p><b>Method:</b> Tarpaulin/Deep/Broadcast</p> <p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b>  SAC   SC   SJV   SED   VEN        X    X    X     X     X</p> <p><b>Method Description:</b></p> <ul style="list-style-type: none"> <li>• Injection point must be at least 18 inches below the soil surface.</li> <li>• Chisel trace must be eliminated by use of tillage equipment to mix the soil to a depth of at least three inches. Broadcast fumigation must be followed by compaction of the soil surface.</li> <li>• Tarpaulins must be buried under at least four inches of firmly packed soil at the end of the rows.</li> <li>• The operator of the property shall maintain a “tarpaulin repair response plan” pursuant to subsection (d).</li> </ul>	<p><b>Method Code:</b> 1207 <b>Emission Rating:</b> 44%</p>
<p><b>Method:</b> Tarpaulin/Deep/Bed</p> <p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b>  SAC   SC   SJV   SED   VEN        X    X    X     X     X</p> <p><b>Method Description:</b></p> <ul style="list-style-type: none"> <li>• Injection point must be at least 18 inches below the soil surface.</li> <li>• Chisel trace must be eliminated by use of tillage equipment to mix the soil to at depth of at least three inches.</li> <li>• Tarpaulins must be buried under at least four inches of firmly packed soil at the end of the rows.</li> <li>• The operator of the property shall maintain a “tarpaulin repair response plan” pursuant to subsection (d).</li> </ul>	<p><b>Method Code:</b> 1208 <b>Emission Rating:</b> 44%</p>
<p><b>Method:</b> Chemigation (Drip System)/Tarpaulin</p> <p><b>Method allowed (X) in these NAAs (May 1 –October 31):</b>  SAC   SC   SJV   SED   VEN        X    X    X     X     X</p> <p><b>Method Description:</b></p> <ul style="list-style-type: none"> <li>• Drip system must be filled with water and tested for pressure variation, clogged emitters, and leaks before chemigation. The pressure must not exceed the pressure rating of the drip tape and the pressure variation in the drip tape throughout the field must be less than three pounds per square inch. Drip system must be free of leaks and clogged emitters.</li> <li>• The tarpaulin shall be placed and inspected for tears, holes, or improperly secured edges prior to fumigating. Repairs and adjustments shall be made before the chemigation begins.</li> <li>• Ends of drip tape not covered by tarpaulin must be covered by two inches of soil.</li> <li>• After chemigation, the drip system must be flushed with a volume of water at least three times the volume of the mainline and laterals of the drip system.</li> <li>• The operator of the property shall maintain a “tarpaulin repair response plan” pursuant to subsection (d).</li> </ul>	<p><b>Method Code:</b> 1209 <b>Emission Rating:</b> 12%</p>