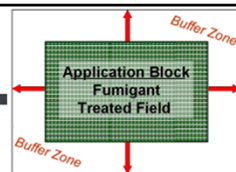




Buffer Zones

- **General Overview**
- **Restrictions**
 - Overlap and duration
 - Difficult to control / evacuate sites
 - Structures within Buffers
 - Reentry, worker training & respiratory protections
 - Emergency Preparedness measures
 - Air monitoring Requirements
 - Rights of Way / Local Permission
 - Written Permission / Areas not under owner / applicator control
 - Posting
- **Calculation of Buffer Zone Distances**
 - Use of co-formulated fumigant products / multiple products
 - Look up tables
 - Buffer credits
 - Examples of Buffer Zone Calculation with various credits



Welcome to Fumigant Training Module number 6 - Buffer Zones

This presentation will include a General Overview of buffer zones, including its Definition, and 2011 implementation schedule.

It will describe many of the new Label Restrictions being imposed by EPA to include:

Buffer Overlap and duration
Buffer Zone requirements when fumigations occur close to Difficult to control / evacuate sites (schools, hospitals, clinics, day care, nursing home, etc.)
Structures within Buffers (occupancy)
Reentry, worker training & respiratory protections
Emergency Preparedness and Response measures
Air monitoring Requirements during the buffer zone period
We will describe scenarios and situations where permission from local authorities is required for roads and Rights of Way
As well as Areas not under owner / applicator control
And finally, to describe new buffer zone posting requirement.

Module 6 will also present and discuss procedures used to make Calculation of Buffer Zone Distances including:

Use of coformulated fumigant products / simultaneous application of multiple products (1,3-d, PIC, Metam)
It will describe how to use Look up tables (application method, application rate, acreage treated per day, tarp, no tarp, etc....)
Buffer credits (approved tarp(30-60%); Symmetry(10%); organic matter(10-30%); Soil temp <50F(10%), clay content (10%)
Examples of Buffer Zone Calculation with various credits

EPA 2-Phase Implementation Schedule



Table 2. Implementation Schedule for Soil Fumigant Risk Mitigation Measures

Risk Mitigation Measure	Currently	2010	2011
Restricted Use	•	•	•
New Good Agricultural Practices		•	•
Rate reductions		•	•
Use site limitations		•	•
New handler protections		•	•
Tarp cutting and removal restrictions		•	•
Extended worker reentry restrictions		•	•
Training information for workers		•	•
Fumigant Management Plans		○	•
First responder and community outreach		○	•
Applicator training		○	•
Compliance assistance and assurance measures		○	•
Restrictions on applications near sensitive areas			•
Buffer zones around all occupied sites			•
Buffer credits for best practices			•
Buffer posting			•
Buffer overlap prohibitions			•
Emergency preparedness measures			•

○ = under development
 • = adopt completely

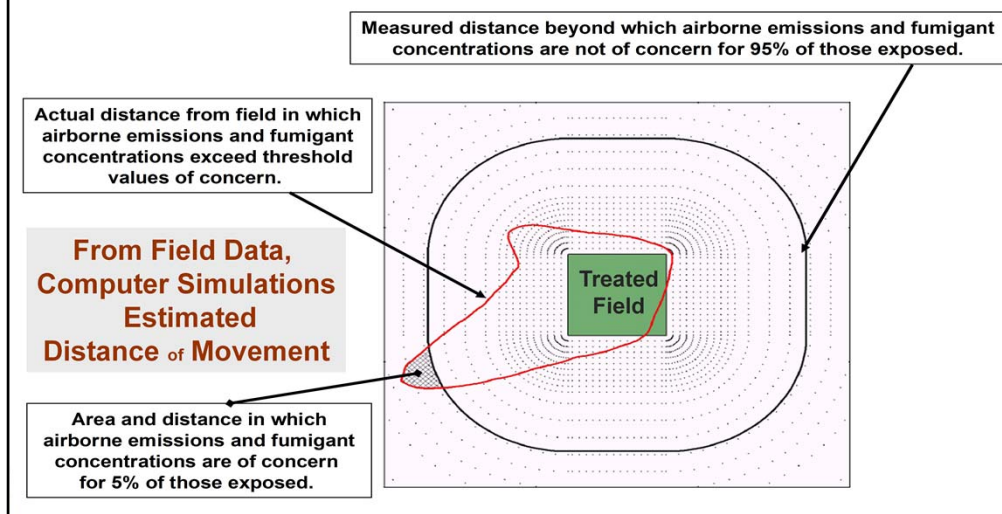
As indicated in previous Fumigant Training modules, EPA has mandated the addition of many new changes to fumigant labels which include a variety of new risk mitigation measures in a 2 year stepwise approach. Some of the new label requirements will be implemented during late 2010, while others will be required from a second round of new labels which will appear in 2011.

Beginning as early as December 2010, new label language will appear which will formally require certified applicators to complete a written fumigant Management Plan prior to any days fumigant application in the field. In 2010 - a FMP will only be required to only capture that information contained within the fumigant labels published in 2010, phase 1 of the implement schedule.

In 2011, - a FMP must also capture second phase label requirements which will require the certified applicator to document compliance with new buffer zone requirements and **emergency preparedness measures and procedures**. For this training module we will specifically discuss BUFFER ZONES

Thresholds of Concern

Establishing buffer zone distances using- **Thresholds of Concern: Boundary lines around the entire perimeter of a Fumigant Treated Field** Which consider fumigant emissions and bystander exposure.



Lets begin the discussion of buffer zones with some background information. EPA decided early in the fumigant reregistration process to Establish buffer zone distances using- Thresholds of Concern: Boundary lines around the entire perimeter of a Fumigant Treated Field which consider fumigant emissions and potential bystander exposure. It was from the projected distances that fumigants move off-site from the fumigated field and at levels above the thresholds of concern, that EPA ultimately decided there was a need for BUFFER ZONES.

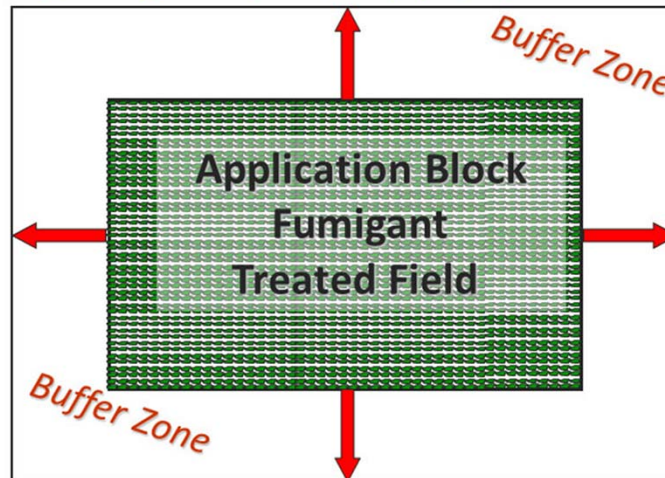
This graph serves to illustrate how EPA simulated the outgassing of a fumigant from soil and its downwind movement from the treated field.

EPA then, using threshold concentrations of the fumigant, calculated the distance from the periphery of the treated field beyond which airborne emissions and fumigant concentrations would not be of concern for 95% of the people who might be exposed.

These distances were translated for each of the fumigants and to the new requirement for buffer zones to surround fumigant treated fields.

What are Buffer Zones?

Buffer Zones are areas surrounding the application block, extending outward in all directions from the treated field, a specified distance, where workers or bystanders must be excluded during the buffer zone period, except for people in transit.

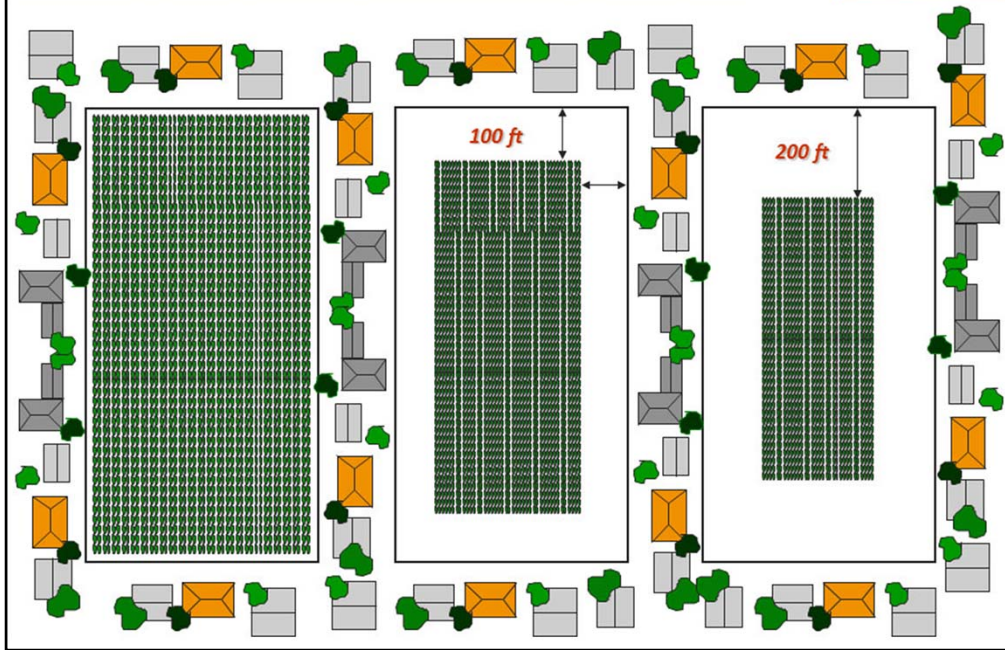


It is time to describe what a Buffer zone is:

Buffer Zones are areas surrounding the application block, extending outward in all directions from the treated field, a specified distance, where workers or bystanders must be excluded during the buffer zone period, except for people in transit.

The buffer zone must extend from the edge of the application block or greenhouse perimeter equally in all directions.

How will Buffer Zone Distances be Determined?



Buffer zone distances will be determined from look-up tables on product labels. It will be a multistep process, requiring the applicator to select and detail a number of site-specific application parameters.

Twenty-five feet is the minimum buffer distance, while the maximum buffer distance allowed is a ½ mile, regardless of site-specific application parameters.

How will Buffer Zone Distance be Determined

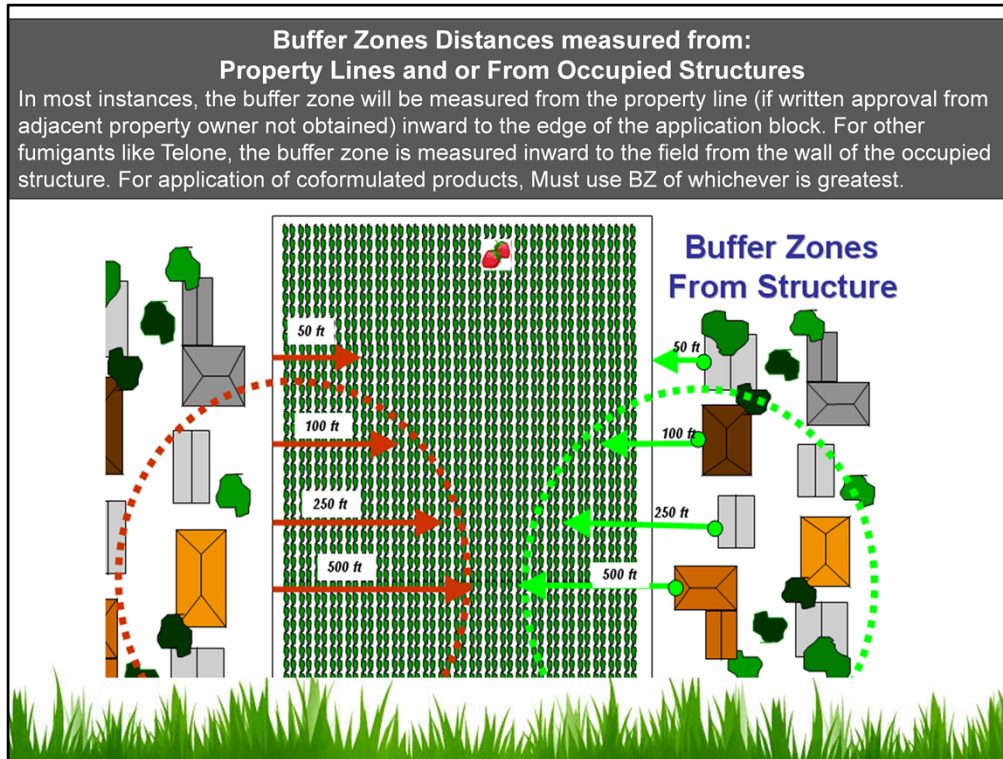


Must 1st Match the Application Method and Mulch Use Practice to be used to the Appropriate Buffer Zone Look-up Table

Table 16 Drip Tarp Buffer Zones

Broadcast Equivalent Application Rate (lbs. a/a)	Application Block Size (Acres)																			
	1	2	3	4	5	6	7	8	9	10	15	20	25	30	35	40	50	60	70	80
120	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
125	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
130	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
135	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
140	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
145	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
150	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
155	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
160	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
165	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
170	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
175	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
180	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
185	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
190	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
195	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
200	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
205	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
210	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
215	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
220	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
225	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
230	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
235	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
240	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
245	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
250	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
255	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
260	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
265	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
270	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
275	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
280	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
285	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
290	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
295	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
300	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Buffer zone distances must be based on look-up tables on product labels. There will be many different buffer zone tables within the new fumigant label, and thus the 1st step in selecting the appropriate buffer zone look-up table will be to Match the application method and plastic mulch use practice to be employed to that of the appropriate buffer zone table within the label. For the scenario depicted here, the applicator intends to apply the fumigant under a plastic mulch cover and through the drip irrigation system. For this practice, the applicator has selected to use the Drip and Tarp Table from the fumigant label.

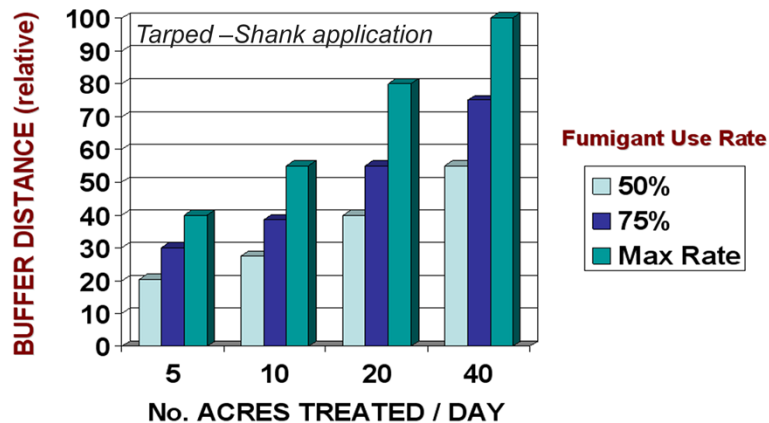
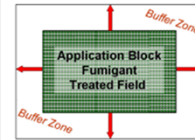


Other considerations for determinations of Buffer Zones Distances will be to insure what the reference point for determination will be, whether the buffer zones is related to Property Line or to wall of Occupied Structure.

In most instances, the buffer zone will be measured from the property line (if written approval from adjacent property owner not obtained) inward to the edge of the application block. For other fumigants like Telone, the buffer zone is measured inward from the edge of the application block to the wall of the occupied structure. For coformulated fumigant products, products which contain 2 or more different fumigants, the applicator must determine the buffer zone for each fumigant and then Must use the buffer zone of whichever is greatest, or most restrictive.

How are Buffer Zone Distances Determined?

Buffer zone distances will be calculated from Look-up Tables printed within the new fumigant labels, and determined by fumigant application rate per acre, how much of an active ingredient is applied per acre, method of application, whether a plastic tarp or mulch is used, and the number of acres treated per day.



After identifying the method of application and whether a specific plastic mulch tarp will be used during the application, The next step in determining the appropriate Buffer zone distance will be declare what the application rate will be per acre, how much of an active ingredient will be applied per acre, and how many acres will be treated that day. In general, the chart presented here illustrates how buffer zone distances, on a relative scale, will increase with the number of acres which will be fumigated per day, and also how buffer zone distances will increase with fumigant use rate, or rate of application per acre. It should be obvious that reducing buffer zone distances will require some consideration of method of application, use of plastic mulch, numbers of acres treated per day and how much of a given fumigant will be applied per acre.

Calculating the amount of active ingredient applied per acre for Buffer Zone Distance Determinations

Labeled Fumigants- Percentages and weights of individual fumigant compounds expressed by gallon of specific product

Fumigant ¹	EPA Registration Number	Weight per Gallon	Chloropicrin		1,3-dichloropropene (Telone)		Methyl iodide		Methyl Bromide	
			%	Wt (lb)	%	Wt (lb)	%	Wt (lb)	%	Wt (lb)
Methyl bromide 67/33		14.2								
Methyl bromide 50/50		13.9								
Telone II	62719-32	10.15	-	-	97.5	9.85	-	-		
Telone EC	62719-321	10.1	-	-	93.6	9.45	-	-		
Telone C-17	62719-12	10.6	16.5	1.75	81.2	8.6	-	-		
Telone C-35	62719-302	11.2	34.7	3.89	63.4	7.1	-	-		
Telone In-Line	62719-348	11.2	33.3	3.73	60.8	6.81	-	-		
Pic Chlor 60	8536-8	12.1	59.4	7.2	39.0	4.7	-	-		
Pic Chlor 60 EC	8536-43-11220	11.81	56.7	6.73	37.1	4.49	-	-		
Midas 98.2	66300-43	18.9	1.99	0.4	-	-	97.8	18.5		
Midas 50/50	66300-57	15.9	49.75	7.91	-	-	49.9	7.93		
Chloropicrin		14.1	100							
Triclor EC	58266-11220		94	12.58						
Vapam HL	5481-468	10.1	-	-	-	-	-	-	-	42% and 4.26 lb ai/gal
MPam HL	5481-483	10.6	-	-	-	-	-	-	-	54% and 5.8 lb ai/gal
Paladin			-	-	-	-	-	-	-	98.8 % and 8.85 ai/gal
Paladin-PIC		9.6	79							21% DMDS by wt

¹ All of the fumigants mentioned are for retail sale and use only by state certified applicators or persons under their direct supervision. New supplemental labeling for the Telone products must be in the hands of the user at the time of application. See label details for additional use restrictions based on soil characteristics, buffer zones, and requirements for Personal Protective Equipment (PPE).

As just indicated, To be able to determine what the appropriate buffer zone distance is for a particularly application, the certified applicator must be able to express how much of a given fumigant will be applied, more specifically the applicator must express the actual amount of active ingredient applied per acre before a Buffer Zone Distance Determination can be made.

For this example, the certified applicator has chosen to apply Telone C35, a product which contains both 1, 3 –Dichloropropene and Chloropicrin, at a rate of 26 gallons per acre. Intersecting the row identified as Telone C35 with the column heading Chloropicrin wt (lb), indicates that every gallon of the Telone C35 contains 3.89 lb Chloropicrin. To determine how much chloropicrin as an active ingredient of the fumigant will be applied per acre, the applicator must multiply 26 gal/a times 3.89 lb/gal chloropicrin, to determine that 101.1 lb per acre of chloropicrin will be applied per acre. This is the broadcast equivalent application rate per acre that the applicator must use in the appropriate look-up table for a buffer zone determination.

How to Use Buffer Zone Look-Up Tables

Step 1 - Number Acres/Day

The screenshot displays a software window titled "How to Use Buffer Zone Look-Up Tables" with a sub-header "Step 1 - Number Acres/Day". Inside the window is a large grid representing a look-up table. The table's columns are labeled "Application Block Size (1-80 acres)" and its rows are labeled "Broadcast Equivalent Application Rate (90-350 lb/a)". A yellow vertical line highlights the column for "30 acres", and a red horizontal line highlights the row for "100". A callout box on the right side of the table reads: "Step 1 - Number acres/day. If you treat 30 acres per day (find column for 30 acres)". The interface also features a search icon in the bottom right corner and a navigation bar at the bottom with buttons labeled "1", "2", and "3".

All Buffer zone distances must be based on look-up tables printed within each fumigant product' label. Determining a buffer zone distance will require a 4 step process. Before the applicator can proceed to the appropriate look-up table, the applicator must first specify some site specific application parameters. In this example, the applicator has elected to Shank apply the fumigant into a raised Bed, in actual strips across the field, and to tarp the bed with a plastic mulch cover after the fumigant is applied.

The 1st step in the process, Once the appropriate look-up table from the label is selected for this specific application procedure, requires the applicator to specify how many acres will be fumigated that day. In this example, the applicator has selected the column entitled 30 acres per day.

Step 2 - Rate of Application

How to Use Buffer Zone Look-Up Tables

2 Step 2 - Rate of Application

Application Block Size (1- 80acres)

Broadcast Equivalent Application Rate (90-350 lb/a)

Step 2: Rate of Application
If you apply 101 lb/a Chloropicrin
ie., 26 gpa Telone C35
 $26 \text{ gpa} \times 3.89 \text{ lb Pic /gal} = 101.1 \text{ lb/a}$
(find row for 105 lb/a- must round up)

1 2 3

The 2nd step in the process then requires the applicator to track down the 30 acres per day column to the row heading which requires the applicator to specify how much of the active ingredient of the fumigant will be applied per acre, effectively, the Broadcast Equivalent Application Rate expressed (lbs ai/acre). For example, if you apply 101 lb/a Chloropicrin, ie., 26 gpa Telone C35, $26 \text{ gpa} \times 3.89 \text{ lb Pic /gal} = 101.1 \text{ lb/ai}$ per acre of chloropicrin. Since 101 exceeds 100 lb/a, the applicator must round up to 105 lb/a acre when selecting the appropriate row for broadcast equivalent application rate.

Step 3 - Find Intersecting Cell from Table

How to Use Buffer Zone Look-Up Tables

3 Step 3 - Find Intersecting Cell from Table

Application Block Size (1- 80acres)

Broadcast Equivalent Application Rate (90-350 lb/a)

Step 3: Find intersecting cell from Table for

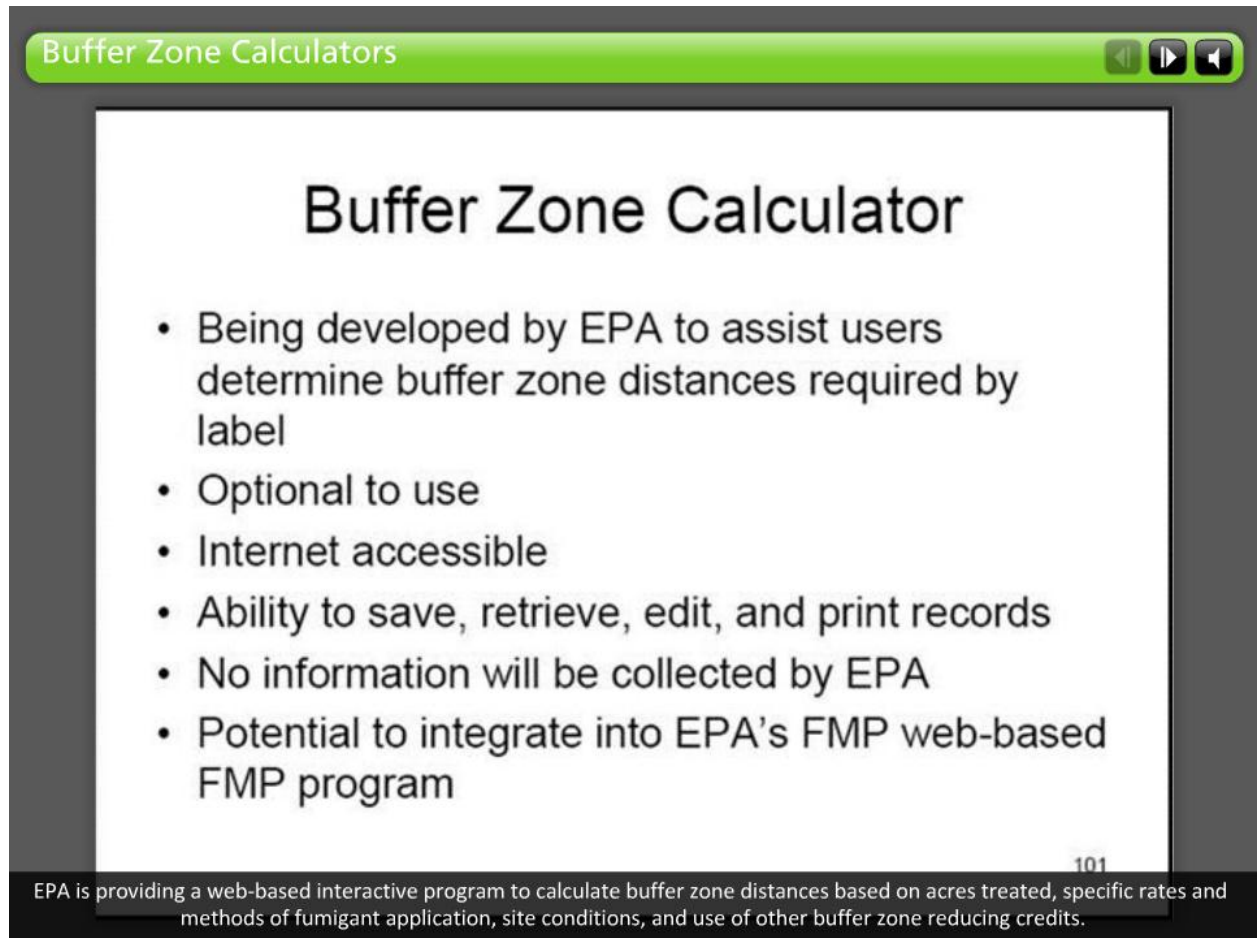
- Number of acres treated per day
- Broadcast equivalent Application Rate (lb/a)

To Find Required Buffer Zone Distance of **25 Feet**

1 2 3

Step 3 involves finding intersecting cell from the buffer zone Table for Number of acres treated per day and Broadcast equivalent Application Rate (lb/a) To Find Required Buffer Zone to determine that a buffer zone Distance of 25 feet is required for the application scenario.

Buffer Zone Calculators



The image shows a presentation slide with a green header bar containing the text 'Buffer Zone Calculators' and navigation icons. The main content area has a white background with the title 'Buffer Zone Calculator' and a bulleted list of features. A footer bar at the bottom contains a small number '101' and a paragraph of text.

Buffer Zone Calculators

Buffer Zone Calculator

- Being developed by EPA to assist users determine buffer zone distances required by label
- Optional to use
- Internet accessible
- Ability to save, retrieve, edit, and print records
- No information will be collected by EPA
- Potential to integrate into EPA's FMP web-based FMP program

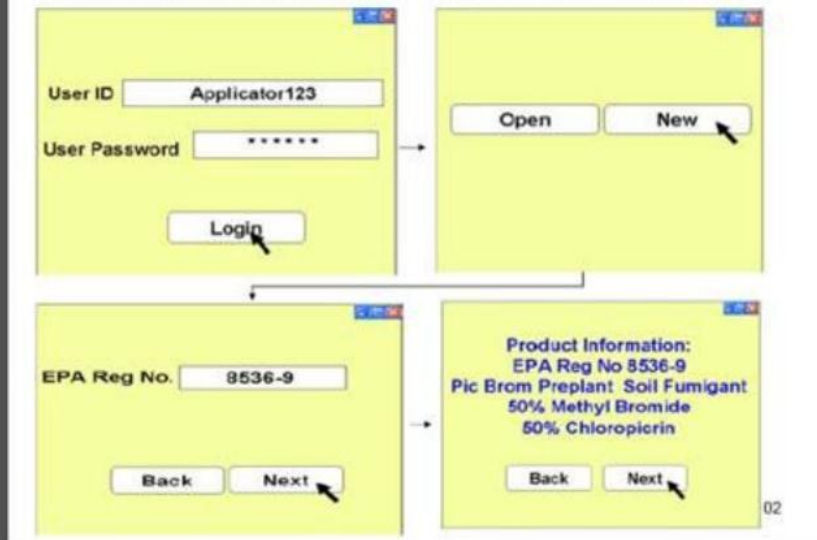
101

EPA is providing a web-based interactive program to calculate buffer zone distances based on acres treated, specific rates and methods of fumigant application, site conditions, and use of other buffer zone reducing credits.

Item Text

EPA is providing a web-based interactive program to calculate buffer zone distances based on acres treated, specific rates and methods of fumigant application, site conditions, and use of other buffer zone reducing credits.

Buffer Zone Calculator (sample screens)





Buffer Zone Calculator (sample screens)

Application Method:

- Tarped shank bedded
- Tarped shank broadcast
- Deep shank untarped
- Outdoor tarped hot gas
- Greenhouse hot gas
- Tree hole

Back Next

Application rate:

- expressed as treated acre rate
- expressed as broadcast or broadcast equivalent rate

Application Rate (lbs product/acre)

Application Block Size (acres)

Back Next

Tarps used:

<input type="radio"/> Casilt Healtic Silver*	<input type="radio"/> Eval/Mtsu TF (1.38 ml)**
<input type="radio"/> Casilt Metalone*	<input type="radio"/> Hytlock 7 Block (0.00125)**
<input type="radio"/> Claflexx Emulsion V6**	<input type="radio"/> XL Stone Blockade (0.00136)**
<input type="radio"/> Nerka VF**	<input type="radio"/> Hylbar (1.5 ml)**
<input checked="" type="radio"/> Plant Blockade**	<input type="radio"/> IPM Clear VF (1.38 ml)**
<input type="radio"/> Bromostop (1.38 ml)**	

None of the above

Tarp buffer credits: * +30% ** +40%

Back Next

Organic content of the soil:

- ≤ 1% (no credit)
- > 1% to 2% (10% credit)
- > 2% - 3% (20% credit)
- > 3% (30% credit)

Clay content of the soil:

- ≤ 27% (no credit)
- ≥ 27 (10% credit)

Potassium thio sulfate applied with 1/2 to 1/4 inch of water over a tarp

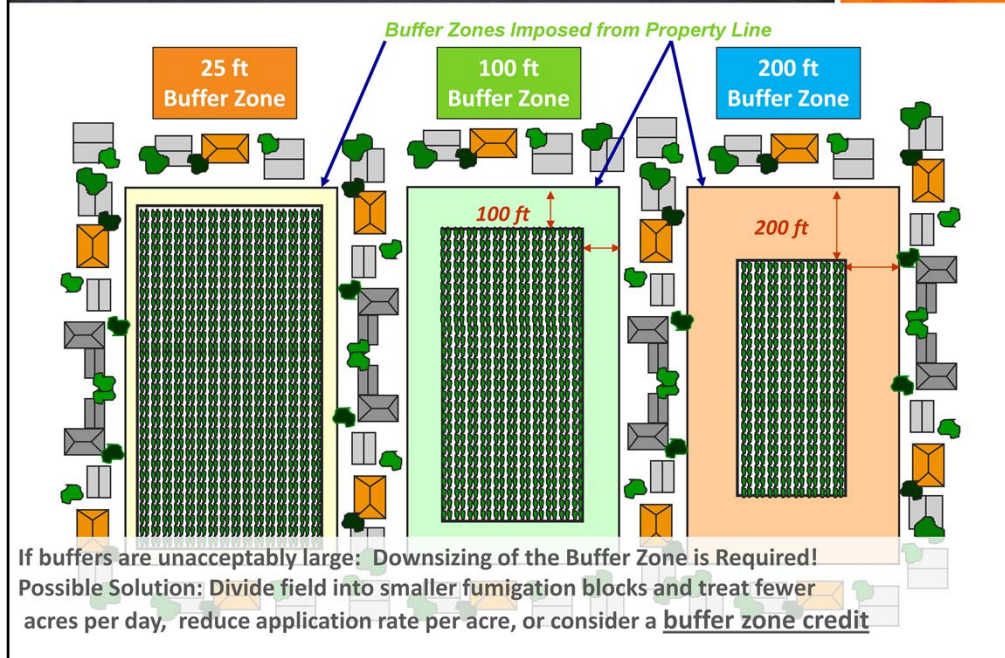
Back Next



Buffer Zone Calculator (sample screen)

Results:
Date and time of calculation: 3/23/2010 11:53 AM
Product Name: Pic-Brom Preplant Soil Fumigant
EPA Reg No: 8536-9
Active ingredients in the product that will be applied:
MeBr (50%) and Chloropicrin (50%)
Application Method: Tarped bedded
Application rate: 240 lbs product/acre
Application Block Size: 20 acres
Buffer Zone Credits Applied: Pliant Blockade Tarp (60% reduction)
Total % of reduction with credits: 60% reduction
Minimum buffer zone distance without credits: 323 feet
Minimum buffer zone distance with credits: 130 feet

Potential Impacts of Buffer Zones of Different Sizes on Treated Field Size



This illustration is designed to demonstrate the potential Impacts of Buffer Zones of Different Sizes on Treated Field Size.

If buffers are deemed unacceptably large by the grower or certified applicator, then Downsizing of the Buffer Zone is Required! One Possible Solution might be to Divide the field into smaller fumigation blocks and treat fewer acres per day, reduce application rate per acre, or to consider a buffer zone credit.

Reducing Distances with Buffer Zone Credits	
Buffer Zone Reducing Credit	Amount (%)
approved High Barrier Tarps	~30%
approved Select VIF Tarps	~60%
Soil Conditions <small>(soit temp, moisture, clay / organic contents)</small>	~10-30%
Potassium Thiosulfate Other Water seals	~15%
Buffer Zone Credit Cap	80%

Buffer Zone Reducing Credits do not apply to Telone Products

Based on scientific data which shows that field emissions of fumigant gases can be reduced significantly if different production practices are adopted, EPA has established provided for the use of buffer zone reducing credits for use of production practices or when specific environmental conditions exist at the time of fumigant application. As a result, buffers for growers who use emission-reducing tarps or application methods, or have site conditions that qualify for credits will have smaller buffers than those specified in the any given buffer zone look-up table. The Agency has determined that the buffer zone credits were additive and has placed a limit, or "credit cap," Of 80% on the total size of the buffer zone credit allowed for use of any fumigant.

The new credits for individual buffer zone reducing factors include:

- a 30 to 60% buffer credit is allowed for using a high barrier, semi-gas impermeable plastic mulch tarps and the higher credit of 60% for use of an approved virtually approved tarps.
- a 10% credit for applications of Potassium Thiosulfate, an additive to sprinkler irrigation water which reduces fumigant emissions when potatssium thiosulfate is applied to the top of tarps after a fumigation. EPA has defined an organic matter credit of 10% credit will be given if soils have an organic matter range of >1% - 2%; a 20% credit for soils with an organic matter range of >2% - 3%; and a 30% credit for soils with an organic matter range of >3%. As indicated previously, EPA that the buffer zone credits were additive. This means, for example, that a 30 to 60% credit for a high barrier tarp could be added to a 10 % credit for organic matter to achieve a total credit of up to 70%. EPA has placed a limit, or "credit cap," of 80% on the total size of the credit allowed for use of soil fumigant.

Other Buffer Zone Requirements and Considerations

Buffer Zone Overlap

A buffer zone may NOT overlap buffer zones from other application blocks that are already in effect UNLESS a minimum of **12 hours** has elapsed from the time the first application ends until the second application begins. (conclude field work by 6:00 pm can start adjacent block 6:00 am)

Buffer Zone Duration

EPA mandates buffer zones around each application block to be in effect for **48 hours** and that only properly trained and PPE equipped handlers are allowed to enter into buffers zones. It starts when a fumigant is first delivered to the soil and is in effect for 48 hours after the fumigant has stopped being delivered to the soil.

EPA is concerned that emissions from multiple fields located close to one another could be higher than air concentrations from individually treated fields. Because of this EPA decided that A buffer zone may NOT overlap buffer zones from other application blocks that are already in effect UNLESS a minimum of **12 hours** has elapsed from the time the first application ends until the second application begins. (conclude field work by 6:00 pm can start adjacent block 6:00 am)

By separating the application times by at least 12 hours the fumigant emission peaks are less likely to occur at the same time which would sufficiently reduce potential exposure outside buffer zones and meets the Agency's protection goals.

EPA has determined that when fumigators exercise the exception to allow buffers to overlap, the emergency preparedness and response measures described later in this document must be implemented if there are homes, businesses, or property not within the control of the fumigator within 300 feet of the buffer zone.

EPA has also mandated buffer zones around each application block to be in effect for **48 hours** and that only properly trained and PPE equipped handlers are allowed to enter into buffers zones. It starts when a fumigant is first delivered to the soil and is in effect for 48 hours after the fumigant has stopped being delivered to the soil.

Buffer Zones

Buffers Extending into Adjacent Land

Certified applicators must obtain written permission from other landowners when buffers extend onto other property holders lands.

Roadways, Public walkways, Posting

Buffer zones may include publicly owned and/or operated roads, including rights of ways, without first obtaining written permission from local authorities. However, if a sidewalk or permanent walking path is associated with the road or right-of-way, written permission must be given by the appropriate state and/or local authorities.

Buffer zones may not include bus stops or other locations where people wait for public transit. All treatment areas and buffers be clearly posted with proper signage.

In summary, areas of a buffer zone not under the control of the owner/operator of the application block may not include residential areas (including employee housing, private property, buildings, commercial, industrial, and other areas that people may occupy or outdoor residential areas, such as lawns, gardens, or play areas) unless the occupants provide written agreement that they will voluntarily vacate the buffer zone during the entire buffer zone period.

The Agency believes that requiring the applicator to obtain written permission will be an enforceable measure that will meet the goal of protecting workers and bystanders on adjacent properties that fall within a buffer zone.

However, for roads and rights-of-ways, EPA has determined that these may be included in buffers, subject to local laws and regulations, as long as it is posted according to the requirements of this amended RED. If, the road or right-of-way has an associated sidewalk or permanent walking path, then written permission would also be required to include the area in the buffer zone.

Buffer zones may include publicly owned and/or operated roads, including rights of ways, without first obtaining written permission from local authorities; however, if a sidewalk or permanent walking path is associated with the road or right-of-way, written permission must be given by the appropriate state and/or local authorities.

Buffer zones may not include bus stops or other locations where people wait for public transit. All treatment areas and buffers be clearly posted both proper signage.

Structures under the control of owner/operator of the application block

- Buffer zones may not include buildings used for storage such as sheds, barns, garages, etc., UNLESS,
 1. The storage buildings are not occupied during the buffer zone period, and
 2. The storage buildings do not share a common wall with an occupied structure.
- See the Posting Section of this document for additional requirements that may apply.

Buffer Zone Posting Signs

Important Considerations

- All usual points of entry
- WPS standard for Text size, and specific language
- Posted before beginning
- Minimum of 48 hr BZ duration
- Signs removed within 3 days after BZ expires



EPA has determined that to ensure the protectiveness of buffer zones for bystanders and handlers, the perimeter of the fumigant buffer zones must be posted. Buffer zone signs must be posted at usual points of entry and likely routes of approach to buffer zones. Some examples of points of entry include, but are not limited to, roadways, sidewalks, paths, and bike trails. Some examples of likely routes of approach are the area between a buffer zone and a roadway, or the area between a buffer zone and a housing development. If there are no usual points of entry or likely routes of approach, then posting is required in the corners of buffer zones, and between the corners, so

- The printed side of the sign must face away from the treated area toward areas from which people could approach.
- Signs must remain legible during entire posting period and must meet the general standards outlined in the WPS for text size and legibility.
- Signs must be posted before the application begins and remain posted for a minimum of the 48 hr buffer zone period.
- Signs must be removed within 3 days after the end of the buffer zone period. has expired.
- The buffer zone sign must also include the - Do not walk symbol, "DO NOT ENTER /NO ENTRE, name of the fumigant, and contact information for the certified applicator in charge of the fumigation.

Early Reentry, Worker Training, Respiratory Protections

Authorized entry to buffer zones

Only authorized handlers who have been properly trained and equipped according to EPA's Worker Protection Standard (WPS) and label requirements may be in the buffer zone during the buffer zone period.

Handlers in Treated Area 1 to 5 Days After Application

Only the following handler tasks may be performed in the treated area within 5 days after the application is complete:

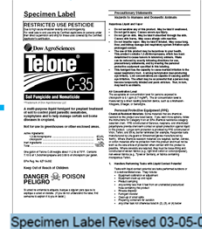
- Assessing/adjusting the soil seal
- Assessing pest control, application technique, or application efficacy
- Sampling air or soil for this product
- Removing tarp or plastic film

All other tasks are prohibited until the 5-day period has expired.

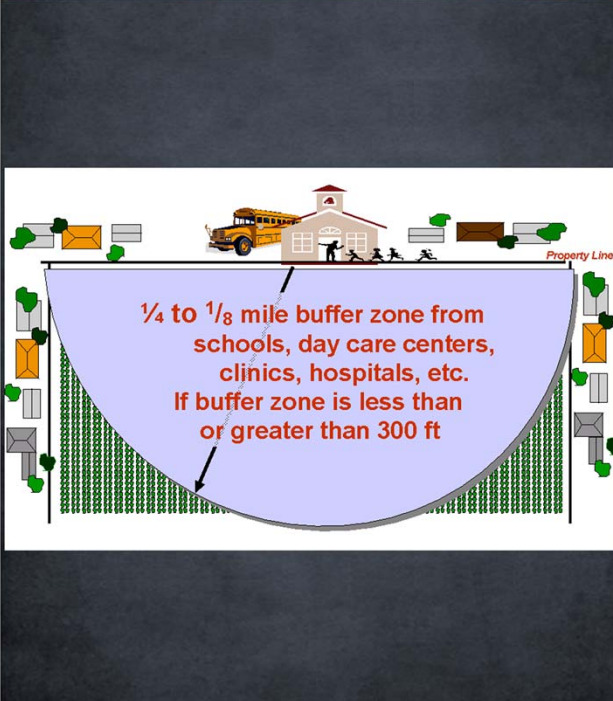
Handlers in treated area 1 to 5 days after application must wear at minimum:

- Loose fitting or well ventilated long-sleeved shirt and long pants
- Shoes and socks
- A face shield or safety glasses with brow and temple shields (do not wear chemical goggles)
- A half-face respirator with either an organic-vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C) or canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G).

If air concentrations of chloropicrin exceed 0.1 ppm, handlers must wear a full-face respirator with either an organic-vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C) or canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G).



There are certain restriction, worker training requirements, and in some case respiratory protections that are required of handlers who enter a buffer zone before the buffer zone duration period of 48 hrs has expired. Only authorized handlers who have been properly trained and equipped according to EPA's Worker Protection Standard (WPS) and label requirements may be in the buffer zone during the buffer zone period. Applicators must carefully review the labels of individual fumigants used to determine which might apply.

"Restrictions for Schools and Other Difficult to Evacuate Sites"	Buffer Zones and Difficult to Evacuate Sites
<ul style="list-style-type: none"> • "Difficult-to-evacuate" sites include schools (preschool to grade 12). State licensed daycare centers, nursing homes, assisted living facilities, hospitals, in-patient clinics, and prisons. • No fumigant application with a buffer zone greater than 300 feet is permitted within ¼ mile (1320 feet) of the sites listed above unless the site is not occupied during the application and the 36-hour period following the start of application. • No fumigant application with a buffer zone of 300 feet or less is permitted within 1/8 mile (660 feet) of the sites listed above unless the site is not occupied during the application and the 36-hour period following the start of application. 	

Certain types of sites and structures have been determined to be difficult to evacuate should an incident occur. EPA determined that for these sites additional measures to reduce the potential need to evacuate these types of sites were necessary to reduce risk of exposure to occupants and address potential challenges associated with an accident.

Difficult-to-evacuate" sites include schools (preschool to grade 12), state licensed daycare centers, nursing homes, assisted living facilities, hospitals, in-patient clinics, and prisons. For these difficult to evacuate sites,

- No fumigant application with a buffer zone greater than 300 feet is permitted within ¼ mile (1320 feet) of the listed sites unless the site is not occupied during the application and the 36-hour period following the application.
- No fumigant application with a buffer zone of 300 feet or less is permitted within 1/8 mile (660 feet) of the listed sites unless the site is not occupied during the application and the 36-hour period following the start of application.

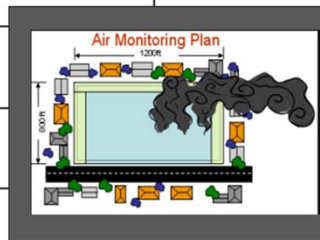
Buffer Zone Air Monitoring Plan

As Reported in the Fumigant Management Plan (FMP)

Air Monitoring Plan

For Buffer Zone Monitoring: (check here if section is not applicable)

Name of handler performing monitoring activities	Handler address	Handler phone number	Location of monitoring	Timing
Fumigation Site Monitoring From the beginning of the fumigant application until the buffer zone period expires, a certified applicator or someone under his/her supervision must: <ul style="list-style-type: none"> Monitor for air concentrations of chloropicrin in areas between the buffer zone perimeter and the areas (such as residences and businesses) that trigger this requirement. Monitoring the air concentration levels must begin the evening on the day of application and continue until the buffer zone period expires with a minimum of at least 8 samples during the buffer zone period, including these periods: <ul style="list-style-type: none"> once, 1 hour before sunset, once, during the night, once, at 1 hour after sunrise, and once, during the day. <p style="text-align: center;">4 times/day for Duration of Buffer zone</p> If at any time the person monitoring the air concentrations experiences sensory irritation, then the <u>emergency response plan</u> stated in the FMP must be immediately implemented. If other problems occur, such as a tarp coming loose, then the appropriate control plan must be activated. The location and results of the air monitoring must be recorded in the post-application summary report.			Areas between buffer zone perimeter and adjacent houses and businesses	•1hr before sunset •Once during night •1 hr after sunrise •Once during day

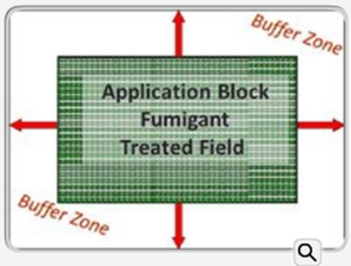


In addition to posting, EPA has also determined that air monitoring of the buffer zone perimeter was necessary to ensure that air concentrations of the fumigant do not exceed an action level which would require implementation of an emergency response plan. As a result, the new fumigant labels will require: From the beginning of the fumigant application in the field until the time at which the buffer zone period expires 48 hours later, a certified applicator or someone under his/her supervision must:

- Monitor for air concentrations of the fumigant being applied in areas between the buffer zone perimeter and the areas (such as residences and businesses) that trigger this requirement. In many cases, this implies an area between the property line of the landowner and occupied structure of a bounding residence.
- Those people charged with Monitoring air concentration levels of the fumigant must begin the evening on the day of application and continue until the buffer zone period expires, 2 days later. There must be a minimum of at least 8 samples taken during the buffer zone period, including these periods:
 - once, 1 hour before sunset,
 - once, during the night,
 - once, at 1 hour after sunrise, and
 - once, during the day.

If at any time the person monitoring the air concentrations experiences sensory irritation, then the emergency response plan stated in the FMP must be immediately implemented.
 If other problems occur, such as a tarp coming loose, then the appropriate control plan must be activated. The location and results of the air monitoring must be recorded in the post-application summary report.

Module 6 Review Summary



1

- Buffer Zones are areas surrounding the application block, extending outward in all directions from the treated field, a specified distance, where workers or bystanders must be excluded during the buffer zone period, except for people in transit.

PROPERTIES
 Allow user to leave interaction:
 Show 'Next Slide' Button:
 Completion Button Label:

After viewing all the steps
 Show upon completion
 Next Slide

Properties...

Edit in Engage

To summarize module 6 on buffer zones,

- Buffer Zones are areas surrounding the application block, extending outward in all directions from the treated field, a specified distance, where workers or bystanders must be excluded during the buffer zone period, except for people in transit.
- The “buffer zone period” starts at the moment when any fumigant is delivered/dispensed to the soil within the application block and lasts for a minimum of 48 hours after the fumigant has stopped being delivered /dispensed to the soil.
- The certified applicator must exclude field workers, nearby residents, pedestrians, and or other bystanders from entering or passage through the buffer zone during the entire buffer zone period.
- Buffer zones may not overlap unless 12 hours have expired between successive fumigations.
- To ensure handlers are aware that they are working in an existing buffer from an overlapping buffer zone area, each new fumigant labels will require the certified applicator, before beginning the application, to determine whether the application block or its resulting buffer will overlap with a buffer that is already in effect. If so, the certified applicator must inform handlers of this, the health effects, early signs of exposure, and respiratory protection and PPE requirements for products applied in both the application block in which they are working and the other application block.

- The certified applicator may exercise the exception to allow buffers to overlap, but must also follow and implement emergency preparedness and response measures if there are homes, businesses, or property not under the control of the applicator within 300 feet of the buffer zone.
- Structures within the buffer zone are not allowed to be occupied during the buffer zone period and interior air samples are required before bystanders can reenter the structure following expiration of the buffer-zone period.
- Buffer zones may include publicly owned and/or operated roads, including rights of ways, without first obtaining written permission from local authorities; however, if a sidewalk or permanent walking path is associated with the road or right-of-way, written permission must be given by the appropriate state and/or local authorities.
- Buffer zones may not include or extend into publicly owned and/or operated areas such as parks, sidewalks, walking paths, playgrounds, and athletic fields without first obtaining written permission from local authorities.
- Vehicular and bicycle traffic on public and private roadways through the buffer zone is permitted. However, bus stops or other locations where persons wait for public transit are not permitted within the buffer zone. "Roadway" means that portion of a street or highway improved, designed or ordinarily used for vehicular travel, exclusive of the sidewalk or shoulder even if such sidewalk or shoulder is used by persons riding bicycles.
- Before a buffer zone can extend into adjacent private residential areas, the applicator must obtain written permission from the owner/operator and any occupants to allow the buffer zone to extend onto the property and that the occupants of any structure also agree in writing that they will voluntarily vacate the buffer zone until the buffer zone period expires.
- Fumigations are prohibited within ¼ mile of difficult to evacuate sites such as schools, state licensed daycare centers, nursing homes, and hospitals, if occupied during the buffer zone period.
- When a fumigant product contains more than one active ingredient, the calculated buffer zone for the active ingredient with the biggest, most restrictive measured distance must be implemented.
- Buffer zone reduction credits are available for: high barrier tarps (40%), high barrier tarps used in combination with the Symmetry™ application system (50%), potassium thiosulfate (KTS) applied over tarped fields (5%), and for soils with high organic matter (10%), and soils with high clay content (10%).
- A 10% buffer zone reducing emission credit is also being provided to reduce the buffers for applications in soils with temperatures of 50°F or less when measured at a soil depth of 3 inches.
- All treatment areas and buffers must be clearly posted with proper signage and

appropriate locations.

<p style="text-align: center;"><i>Buffer Zone Sign</i></p> <p style="text-align: center;"><i>Postings must:</i></p> <ul style="list-style-type: none"> • Be placed at all usual points of entry and along likely routes of approach from areas where people not under the land operator's control may approach the buffer zone. These include, but are not limited to, roadways, sidewalks, paths, and bike trails. • Other examples of likely routes of approach are the area between a buffer zone and a roadway, or the area between a buffer zone and a housing development. 	<p style="text-align: center;"><i>Buffer zone posted signs must meet the following criteria:</i></p> <ul style="list-style-type: none"> • The printed side of the sign must face away from the treated area toward areas from which people could approach. • It must include fumigants used, dates of application, date when reentry is permitted, contact information for certified applicator in charge of application. • Signs must remain legible during entire posting period and must meet the general standards outlined in the WPS for text size and legibility (see 40 CFR §170.120). • Signs must be posted before the application begins and remain posted until the buffer zone period has expired. • Signs must be removed within 3 days after the end of the buffer zone period. • Registrants must provide generic buffer zone posting signs which meet the criteria above at points of sale for applicators to use.
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EPA requires the posting of sign around the buffer zone perimeter. Signs must be placed at all usual points of entry and along likely routes of approach from areas where people not under the land operator's control may approach the buffer zone. These include, but are not limited to, roadways, sidewalks, paths, and bike trails.

Other examples of likely routes of approach are the area between a buffer zone and a roadway, or the area between a buffer zone and a housing development.

Buffer zone posted signs must meet the following criteria:

The printed side of the sign must face away from the treated area toward areas from which people could approach.

It must include fumigants used, dates of application, date when reentry is permitted, contact information for certified applicator in charge of application.

Signs must remain legible during entire posting period and must meet the general standards outlined in the WPS for text size and legibility (see 40 CFR §170.120).

Signs must be posted before the application begins and remain posted until the buffer zone period has expired.

Signs must be removed within 3 days after the end of the buffer zone period.

Registrants must provide generic buffer zone posting signs which meet the criteria above at points of sale for applicators to use.

Module 6 Review Questions

Questions

1. The EPA mandated changes to fumigant labels is a _____ year stepwise project.

The EPA mandated changes to fumigant labels is a _____ year stepwise project.

1

2

3

4

Correct	Choice
	1
X	2
	3
	4

2. New label language will appear which will formally require certified applicators to complete a/an _____ prior to any days fumigant application occurs in the field.

New label language will appear which will formally require certified applicators to complete a/an _____ prior to any days fumigant application occurs in the field.

- sign stating that fumigants will be applied
- form to be submitted to the EPA through an online process
- written fumigant management
- official hazardous chemical notification to local homeowners

Correct	Choice
	sign stating that fumigants will be applied
	form to be submitted to the EPA through an online process
X	written fumigant management
	official hazardous chemical notification to local homeowners

3. Thresholds of concern are boundary lines around the entire perimeter of a Fumigant Treated Field which consider fumigant emissions and potential bystander exposure.

Thresholds of concern are boundary lines around the entire perimeter of a Fumigant Treated Field which consider fumigant emissions and potential bystander exposure.

True

False

Correct	Choice
X	True
	False

4. Buffer Zones should be large enough that the distance from the periphery of the treated field beyond which airborne emissions and fumigant concentrations would not be of concern for 50% of the people who might be exposed.

Buffer Zones should be large enough that the distance from the periphery of the treated field beyond which airborne emissions and fumigant concentrations would not be of concern for 50% of the people who might be exposed.

True

False

Correct	Choice
	True
X	False

5. Buffer zones should extend in the direction that the wind is blowing from the application site.

Buffer zones should extend in the direction that the wind is blowing from the application site.

True

False

Correct	Choice
	True
X	False

6. What is the minimum buffer zone distance mandated by the EPA in feet?

What is the minimum buffer zone distance mandated by the EPA in feet?

Choice
25
25ft
25feet
25 feet
25 ft

7. The maximum buffer zone distance, regardless of site specific parameters is _____?

The maximum buffer zone distance, regardless of site specific parameters is _____?

- 0.5 miles
- 0.75 miles
- 1 mile
- 1.25 miles

Correct	Choice
X	0.5 miles
	0.75 miles
	1 mile
	1.25 miles

8. The 1st step in selecting the appropriate buffer zone look-up table will be to match the application method and plastic mulch use practice to be used to that of the appropriate buffer zone table within the label.

The 1st step in selecting the appropriate buffer zone look-up table will be to match the application method and plastic mulch use practice to be used to that of the appropriate buffer zone table within the label.

True

False

Correct	Choice
X	True
	False

9. In most instances, the buffer zone will be measured from the _____ inward to the edge of the application block.

In most instances, the buffer zone will be measured from the _____ inward to the edge of the application block.

- application site
- building wall
- property line
- nearest road

Correct	Choice
	application site
	building wall
X	property line
	nearest road

10. After identifying the method of application and whether a specific plastic mulch tarp will be used during the application, the next step in determining the appropriate Buffer zone distance will be declare what the application rate will be per acre, how much of an active ingredient will be applied per acre, and how many acres will be treated that day.

After identifying the method of application and whether a specific plastic mulch tarp will be used during the application, the next step in determining the appropriate Buffer zone distance will be declare what the application rate will be per acre, how much of an active ingredient will be applied per acre, and how many acres will be treated that day.

True

False

Correct	Choice
X	True
	False

11. On a relative scale, buffer zone distances will _____ with the number of acres which will be fumigated per day, and also how buffer zone distances will _____ with fumigant use rate, or rate of application per acre.

On a relative scale, buffer zone distances will _____ with the number of acres which will be fumigated per day, and also how buffer zone distances will _____ with fumigant use rate, or rate of application per acre.

- increase/decrease
- increase/increase
- decrease/increase
- decrease/decrease

Correct	Choice
	increase/decrease
X	increase/increase
	decrease/increase
	decrease/decrease

12. The certified applicator must be able to express how much of a given fumigant will be applied, more specifically the applicator must express the actual amount of _____
_____ applied per acre before a Buffer Zone Distance Determination can be made.

The certified applicator must be able to express how much of a given fumigant will be applied, more specifically the applicator must express the actual amount of _____
_____ applied per acre before a Buffer Zone Distance Determination can be made.

Choice

active ingredient

13. The buffer zone distance is obtained by finding the intersecting cell from the buffer zone Table for Number of acres treated per day and the Broadcast equivalent Application Rate (lb/a).

The buffer zone distance is obtained by finding the intersecting cell from the buffer zone Table for Number of acres treated per day and the Broadcast equivalent Application Rate (lb/a).

True

False

Correct	Choice
X	True
	False

14. Once a buffer zone is calculated, if it is deemed too large, the applicator can do several things. Which of the following choices are options for the applicator.

Once a buffer zone is calculated, if it is deemed too large, the applicator can do several things. Which of the following choices are options for the applicator.

- Divide the field into smaller fumigation blocks and treat fewer acres per day
- Reduce application rate per acre
- Consider a buffer zone credit
- None of the choices are possible options

Correct	Choice
X	Divide the field into smaller fumigation blocks and treat fewer acres per day
X	Reduce application rate per acre
X	Consider a buffer zone credit
	None of the choices are possible options

15. EPA has placed a limit, or "credit cap," of 80% on the total size of the credit allowed for use of soil fumigant which means which of the following?

EPA has placed a limit, or "credit cap," of 80% on the total size of the credit allowed for use of soil fumigant which means which of the following?

- 80% more of the fumigant can be applied
- 80% distance must be added to the buffer zone
- 80% distance can be subtracted from the buffer zone
- 80% less fumigant should be applied

Correct	Choice
	80% more of the fumigant can be applied
	80% distance must be added to the buffer zone
X	80% distance can be subtracted from the buffer zone
	80% less fumigant should be applied

16. Buffer zone credits are based on the principal that field emissions of fumigant gases can be reduced significantly if different production practices are adopted.

Buffer zone credits are based on the principal that field emissions of fumigant gases can be reduced significantly if different production practices are adopted.

- True
- False

Correct	Choice
X	True
	False

17. A buffer zone may not overlap buffer zones from other application blocks that are already in effect unless a minimum of _____ has elapsed from the time the first application ends until the second application begins.

A buffer zone may not overlap buffer zones from other application blocks that are already in effect unless a minimum of _____ has elapsed from the time the first application ends until the second application begins.

- 6 hours
- 12 hours
- 18 hours
- 24 hours

Correct	Choice
	6 hours
X	12 hours
	18 hours
	24 hours

18. EPA has also mandated buffer zones around each application block to be in effect for 48 hours and that only properly trained and PPE equipped handlers are allowed to enter into buffers zones.

EPA has also mandated buffer zones around each application block to be in effect for 48 hours and that only properly trained and PPE equipped handlers are allowed to enter into buffers zones.

True

False

Correct	Choice
X	True
	False

19. Certified applicators must obtain oral permission from other landowners when buffers extend onto other property holders lands.

Certified applicators must obtain oral permission from other landowners when buffers extend onto other property holders lands.

True

False

Correct	Choice
	True
X	False

20. Buffer zones can include all of the following areas except:

Buffer zones can include all of the following areas except:

- paved roads
- storage building with no occupants
- open areas with no residences
- bus stops

Correct	Choice
	paved roads
	storage building with no occupants
	open areas with no residences
X	bus stops

21. Signs must be removed within _____ days after the end of the buffer zone period has expired.

Signs must be removed within _____ days after the end of the buffer zone period has expired.

- 1
- 2
- 3
- 4

Correct	Choice
	1
	2
X	3
	4

22. Buffer zone signs must be posted at _____ and likely routes of approach to buffer zones.

Buffer zone signs must be posted at _____ and likely routes of approach to buffer zones.

Choice
usual points of entry
usual entry points

23. No fumigant application with a buffer zone greater than _____ feet is permitted within ¼ mile (1320 feet) of the listed sites unless the site is not occupied during the application and the 36-hour period following the application.

No fumigant application with a buffer zone greater than _____ feet is permitted within ¼ mile (1320 feet) of the listed sites unless the site is not occupied during the application and the 36-hour period following the application.

- 100 ft.
- 300 ft.
- 500 ft.
- 750 ft.

Correct	Choice
	100 ft.
X	300 ft.
	500 ft.
	750 ft.

24. From the beginning of the fumigant application in the field until the time at which the buffer zone period expires 48 hours later, a certified applicator or someone under his/her supervision must take a minimum of _____ air samples during the buffer zone period.

From the beginning of the fumigant application in the field until the time at which the buffer zone period expires 48 hours later, a certified applicator or someone under his/her supervision must take a minimum of _____ air samples during the buffer zone period.

Choice
8
eight