

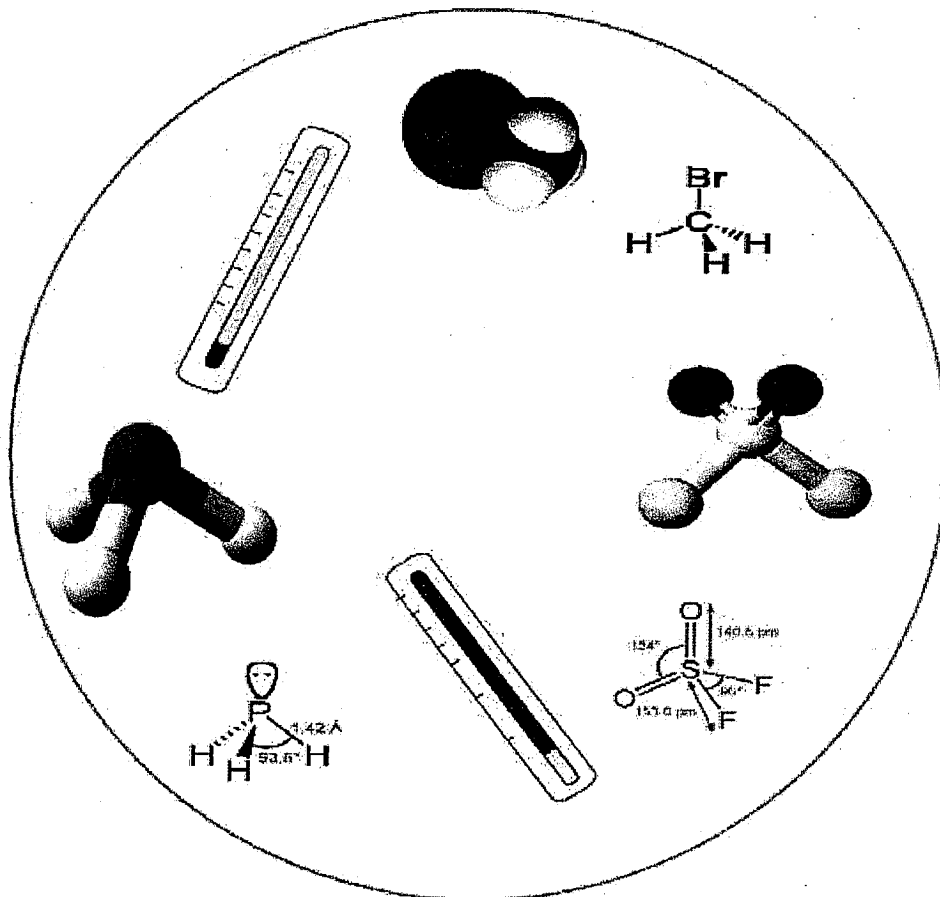


United States  
Department of  
Agriculture

# Treatment Manual

Animal and  
Plant Health  
Inspection  
Service

Plant Protection  
and Quarantine



## T312—Oak Logs and Lumber

There are two alternative treatments for the MB fumigation of Oak logs, T312-a and T312-a-Alternative. Do **not** combine the schedules.

*Special Procedures for Adding Gas to Oak Logs Using T312-a or T312-a-Alternative on page 2-4-31* provides specific instructions for the correct actions to take at each gas concentration reading. Refer to this section (specifically **Table 2-4-8 on page-2-4-32** and **Table 2-4-9 on page-2-4-35**) for every reading.

The following is a list of IMPORTANT items to remember when conducting either of these treatments:

- ◆ Take gas concentration readings 30 minutes after adding gas and record the readings in the CPHST-TQAU electronic 429 Fumigation database.
  - ❖ To access the 429 database go to:  
<http://cphst.aphis.usda.gov/tqau/>
- ◆ Run the fans for 30 minutes and take gas concentration readings whenever additional gas is added.
- ◆ Ensure that the gas concentration readings **do not differ more than 4 ounces among the sampling lines**. If they do, run the fans for 30 more minutes to equalize the gas.
- ◆ Use DriRite® and Ascarite® during the fumigation. Replace the DriRite® when it changes color from blue to pink. Replace the Ascarite® when the granules become hard or moist.
- ◆ Aerate the logs for a minimum of 48 hours. Follow aeration procedures under sections *Aerating Sorptive Commodities in Containers—Indoors and Outdoors* on page 2-4-46 and *Aerating Sorptive, Noncontainerized Cargo—Indoors and Outdoors* on page 2-4-44.
- ◆ Add additional time onto the end of the fumigation and record the gas concentration reading in the electronic 429 database. Explain the reason the treatment was extended in the Remarks section of the PPQ Form 429.



The 72 hour reading **MUST** be taken even if the fumigation has been extended. Take the 72 hour reading and then take the extra reading as required by **Table 2-4-8 on page-2-4-32** or **Table 2-4-9 on page-2-4-35** in the section *Special Procedures for Adding Gas to Oak Logs Using T312-a or T312-a-Alternative on page 2-4-31*.

**T312-a**

**Oak logs**

Pest: Oak Wilt Disease

Treatment T312-a—MB (“Q” label only) at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At <sup>1</sup> :						
		0.5 hr <sup>2</sup>	2 hrs <sup>3</sup>	12 hrs	24 <sup>4</sup> hrs	36 hrs	48 hrs	72 hrs
40 °F or above	15 lbs	240	240	200	240	160	120	80

- 1 Refer to Table 5-4-1 for adding gas at each reading.
- 2 If the fumigation is conducted in a closed-door container, take the first reading at 1 hour instead of 0.5 hours.
- 3 If the fumigation is conducted in a closed-door container, take the second reading at 2.5 hour instead of 2 hours.
- 4 After 24 hours, add enough fumigant to bring the concentration up to 240 oz.

**T312-a-  
Alternative**

**Oak logs-Alternative**

Pest: Oak Wilt Disease

Treatment T312-a-Alternative—MB (“Q” label only) at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At <sup>1</sup> :				
		0.5 hr <sup>2</sup>	2 hrs <sup>3</sup>	24 hrs <sup>4</sup>	48 hrs	72 hrs
40 °F or above	15 lbs	240	240	240	140	100

- 1 Refer to Table 5-4-2 for adding gas at each reading.
- 2 If the fumigation is conducted in a closed-door container, take the first reading at 1 hour instead of 0.5 hours.
- 3 If the fumigation is conducted in a closed-door container, take the second reading at 2.5 hour instead of 2 hours.
- 4 After 24 hours, add enough fumigant to bring the concentration up to 240 oz.

**T312-b**

**Oak lumber**

Pest: Oak Wilt Disease

Treatment T312-b—MB (“Q” label only) at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:					
		0.5 hr <sup>1</sup>	2 hrs <sup>2</sup>	12 hrs	24 <sup>3</sup> hrs	36 hrs	48 hrs
40 °F or above	15 lbs	240	160	100	40	120	80

- 1 If the fumigation is conducted in a closed-door container, take the first reading at 1 hour instead of 0.5 hours.
- 2 If the fumigation is conducted in a closed-door container, take the second reading at 2.5 hour instead of 2 hours.
- 3 After 24 hours, add enough fumigant to bring the concentration up to 240 oz.

### Special Procedures for Adding Gas to Oak Logs Using T312 or T312-a-Alternative

There are two alternative treatments for the MB fumigation of Oak logs. Refer to **Table 5-4-1** and **Table 5-4-2** for actions to take during the fumigation of Oak Logs using T312-a or T312-a-Alternative.

Use the following formula to calculate the amount of gas to add to the enclosure:

$$1.6 \times (\text{number of oz. below the required minimum}) \times (\text{volume in ft}^3) / 1,000 \text{ ft}^3 \\ = \text{oz. of gas to add.}$$

After adding gas, run the fans for 30 minutes and take additional gas concentration readings.

Refer to **Table 5-4-1** if using T312-a and **Table 5-4-2** if using T312-a-Alternative to determine how much additional time must be added to the fumigation to compensate for the low gas concentrations.

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**EXAMPLE:** The treatment schedule is T312-a-Alternative. The size of the enclosure is 2400 ft<sup>3</sup>. The required reading at 48 hours must be a minimum of 140 ounces. The actual lowest reading is 132 ounces. Calculate the amount of gas to add to the enclosure using the formula:

$$1.6 \times (\text{the number of ounces below 140}) \times (\text{volume in ft}^3) / 1000 \text{ ft}^3$$

ANSWER:

$$140 - 132 = 8$$

$$1.6 \times 8 \times 2400 = 30,720 / 1000 = 30.72 \text{ ounces of gas to add}$$

$$30.72 / 16 = 1.92 \text{ pounds of gas to add}$$

Determine the amount of time to add by referring to **Table 5-4-2**. In this example, 1 hour will be added to the total fumigation time.

Take the regularly scheduled reading at 72 hours (the minimum should be 100 ounces.)

Take another reading at 73 hours (the minimum should be 100 ounces.)

If the minimum is **not** 100 ounces, add more gas and time according to **Table 5-4-2**.

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### Instructions for Adding Gas and Time to Schedule T312-a

Do **not** combine Schedules T312-a and T312-a-Alternative. The treatment must be aborted if any individual gas concentration reading is 50 percent or more below the minimum required concentration.


**Table 5-4-1 Determine Gas Concentration Values and Corrections for Oak Log Fumigations using Schedule T312-a**

0.5 hour <sup>1</sup>	121-239	1. ADD gas, and 2. EXTEND exposure by 0.5 hour
	0-120	ABORT
2 hours <sup>2</sup>	160-239	1. ADD gas, and 2. EXTEND exposure by 0.5 hour
	121-159	1. ADD gas, and 2. EXTEND exposure by 1.0 hour
	0-120	ABORT
12 hours	190-199	1. ADD gas, and 2. EXTEND exposure by 0.5 hour
	180-189	1. ADD gas, and 2. EXTEND exposure by 1.0 hour
	170-179	1. ADD gas, and 2. EXTEND exposure by 1.5 hours
	160-169	1. ADD gas, and 2. EXTEND exposure by 2.0 hours
	150-159	1. ADD gas, and 2. EXTEND exposure by 2.5 hours
	140-149	1. ADD gas, and 2. EXTEND exposure by 3.0 hours
	130-139	1. ADD gas, and 2. EXTEND exposure by 3.5 hours
	120-129	1. ADD gas, and 2. EXTEND exposure by 4.0 hours
	110-119	1. ADD gas, and 2. EXTEND exposure by 4.5 hours
	101-109	1. ADD gas, and 2. EXTEND exposure by 5.0 hours
0-100	ABORT	

**Table 5-4-1 Determine Gas Concentration Values and Corrections for Oak Log Fumigations using Schedule T312-a (continued)**

24 hours	120-239	1. Add gas to bring the total concentration to 240 ounces. 2. DO NOT ADD TIME.
	110-119	1. ADD gas, and 2. EXTEND exposure by 1.0 hour
	100-109	1. ADD gas, and 2. EXTEND exposure by 2.0 hours
	90-99	1. ADD gas, and 2. EXTEND exposure by 3.0 hours
	80-89	1. ADD gas, and 2. EXTEND exposure by 4.0 hours
	70-79	1. ADD gas, and 2. EXTEND exposure by 5.0 hours
	61-69	1. ADD gas, and 2. EXTEND exposure by 6.0 hours
	0-60	ABORT
36 hours	150-159	1. ADD gas, and 2. EXTEND exposure by 1.0 hour
	140-149	1. ADD gas, and 2. EXTEND exposure by 1.5 hours
	130-139	1. ADD gas, and 2. EXTEND exposure by 2.5 hours
	120-129	1. ADD gas, and 2. EXTEND exposure by 3.0 hours
	110-119	1. ADD gas, and 2. EXTEND exposure by 4.0 hours
	100-109	1. ADD gas, and 2. EXTEND exposure by 4.5 hours
	90-99	1. ADD gas, and 2. EXTEND exposure by 5.5 hours
	81-89	1. ADD gas, and 2. EXTEND exposure by 6.0 hours
	0-80	ABORT

**Table 5-4-1 Determine Gas Concentration Values and Corrections for Oak Log Fumigations using Schedule T312-a (continued)**

48 hours	110-119	1. ADD gas, and 2. EXTEND exposure by 1.0 hour
	100-109	1. ADD gas, and 2. EXTEND exposure by 2.0 hours
	90-99	1. ADD gas, and 2. EXTEND exposure by 3.0 hours
	80-89	1. ADD gas, and 2. EXTEND exposure by 4.0 hours
	70-79	1. ADD gas, and 2. EXTEND exposure by 5.0 hours
	61-69	1. ADD gas, and 2. EXTEND exposure by 6.0 hours
	0-60	ABORT
72 hours	70-79	1. ADD gas, and 2. EXTEND exposure by 3.0 hours
	60-69	1. ADD gas, and 2. EXTEND exposure by 6.0 hours
	50-59	1. ADD gas, and 2. EXTEND exposure by 9.0 hours
	41-49	1. ADD gas, and 2. EXTEND exposure by 12.0 hours
	0-40	ABORT
<div style="display: flex; align-items: center;">  <div style="border: 1px dashed black; padding: 5px;"> <p><b>Important</b></p> <p>If additional time has been added to the treatment, the 72 hour reading AND the extended time reading <b>MUST</b> be taken. If the minimum of 80 ounces is <b>not</b> met, time and gas <b>MUST</b> be added according to this Table.</p> </div> </div>		

- 1 If the fumigation is conducted in a closed-door container, take the first reading at 1 hour instead of 0.5 hours.
- 2 If the fumigation is conducted in a closed-door container, take the second reading at 2.5 hour instead of 2 hours.

## Instructions for Adding Gas and Time to Schedule T312-a-Alternative


Do **not** combine schedules T312-a and T312-a-Alternative.

**Table 5-4-2 Determine Gas Concentration Values and Corrections for Oak Log Fumigations using schedule T312-a-Alternative**

0.5 hours <sup>1</sup>	121-239	1. ADD gas, and 2. DO <b>NOT</b> EXTEND exposure.
	0-120	ABORT
2 hours <sup>2</sup>	160-239	1. ADD gas, and 2. DO <b>NOT</b> EXTEND exposure
	121-159	1. ADD gas, and 2. EXTEND exposure by 1.0 hour
	0-120	ABORT
24 hours	140-239	1. Add gas to bring the total concentration to 240 ounces. 2. DO <b>NOT</b> ADD TIME.
	130-139	1. ADD gas, and 2. EXTEND exposure by 1.0 hour
	120-129	1. ADD gas, and 2. EXTEND exposure by 2.5 hours
	110-119	1. ADD gas, and 2. EXTEND exposure by 4.0 hours
	100-109	1. ADD gas, and 2. EXTEND exposure by 5.5 hours
	90-99	1. ADD gas, and 2. EXTEND exposure by 7.0 hours
	80-89	1. ADD gas, and 2. EXTEND exposure by 8.5 hours
	71-79	1. ADD gas, and 2. EXTEND exposure by 10.0 hours
	0-70	ABORT



**Table 5-4-2 Determine Gas Concentration Values and Corrections for Oak Log Fumigations using schedule T312-a-Alternative (continued)**

48 hours	130-139	1. ADD gas, and 2. EXTEND exposure by 1.0 hour
	120-129	1. ADD gas, and 2. EXTEND exposure by 2.5 hours
	110-119	1. ADD gas, and 2. EXTEND exposure by 4.5 hours
	100-109	1. ADD gas, and 2. EXTEND exposure by 6.0 hours
	90-99	1. ADD gas, and 2. EXTEND exposure by 8.5 hours
	80-89	1. ADD gas, and 2. EXTEND exposure by 9.5 hours
	71-79	1. ADD gas, and 2. EXTEND exposure by 11 hours
	0-70	ABORT
72 hours	90-99	1. ADD gas, and 2. EXTEND exposure by 1.5 hours
	80-89	1. ADD gas, and 2. EXTEND exposure by 4.0 hours
	70-79	1. ADD gas, and 2. EXTEND exposure by 7.5 hours
	60-69	1. ADD gas, and 2. EXTEND exposure by 8.5 hours
	51-59	1. ADD gas, and 2. EXTEND exposure by 11.0 hours
	0-50	ABORT
<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Important</b></p> <p>If additional time has been added to the treatment, the 72 hour reading AND the extended time reading <b>MUST</b> be taken. If the minimum of 100 ounces is <b>not</b> met, time and gas <b>MUST</b> be added according to this Table.</p> </div> </div>		

- 1 If the fumigation is conducted in a closed-door container, take the first reading at 1 hour instead of 0.5 hours.
- 2 If the fumigation is conducted in a closed-door container, take the second reading at 2.5 hour instead of 2 hours.

## T313—Christmas Trees



Cut trees at least 2 weeks prior to treatment in order to reduce possible damage by the fumigant to the trees.

### T313-a

#### Cut conifer Christmas trees

Pest: *Lymantria dispar* (gypsy moth) egg masses

Treatment: T313-a—MB (“Q” label only) at NAP—tarpaulin or chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2.5 hrs	3 hrs	4 hrs	4.5 hrs
75 °F or above	1.5 lbs	18	12	—	—	—
70-74 °F	2 lbs	24	16	—	—	—
60-69 °F	2.5 lbs	30	—	24	—	—
60-69 °F	3 lbs	36	24	—	—	—
50-59 °F	3 lbs	36	—	—	24	—
50-59 °F	4 lbs	48	32	—	—	—
40-49 °F	3.5 lbs	42	—	—	—	28
40-49 °F	5 lbs	60	40	—	—	—

### T313-b

#### Cut pine Christmas trees and pine logs

Pest: *Tomicus piniperda* (pine shoot beetle)

Treatment: T313-b—MB (“Q” label only) at NAP—chamber or tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		2 hrs	3 hrs	3.5 hrs	4 hrs
60 °F or above	3 lbs	43	—	—	36
60 °F or above	4 lbs	57	48	—	—
50-59 °F	3.5 lbs	50	—	—	42
50-59 °F	4 lbs	57	—	48	—
40-49 °F	4 lbs	57	—	—	48



If treating pine Christmas trees for both gypsy moth egg masses and the pine shoot beetle, use the schedule for the pine shoot beetle since it is more potent.

## T314—Logs and Firewood

These heat treatment procedures may employ steam, hot water, kilns, or any other method that raises the temperature of the **center** of the log to the minimum required temperature for the time specified. Procedures for obtaining internal log temperature can be found in the chapter "Methyl Bromide-Tarpaulin", section *Logs and Lumber* on page 2-4-16.

The heat treatment must be performed at an approved facility that maintains a current compliance agreement. The PPQ official will review facility treatment records to ensure the treatment temperature and duration requirements have been met.

Contact USDA-APHIS-CPHST-PPQ Pest Survey Detection and Exclusion Laboratory at 508-563-9303 ext. 259 for a list of approved facilities, temperature monitoring equipment and operational guidelines.



For annual facility certification guidelines, follow the procedures in "*Certifying Facilities for the Heat Treatment of Firewood* on page 6-9-1.

Important

### T314-a

#### Regulated Wood Articles<sup>2</sup>, including *Fraxinus* (Ash Logs and firewood) and all Hardwood Firewood from Emerald Ash Borer quarantine areas

Pest: *Agrilus planipennis* (Emerald Ash Borer)

Treatment: T314-a—Heat treatment

Unit	Temperature	Time (minutes)
°F	140.0	60
°C	60.0	60

### T314-b

#### All logs (including firewood) from Gypsy Moth quarantine areas<sup>3</sup>

Pest: *Lymantria dispar* (Gypsy Moth egg masses)

Treatment: T314-b—Heat treatment

Unit	Temperature	Time (minutes)
°F	132.8	30
°C	56.0	30

2 Emerald Ash Borer regulated articles include: firewood of all hardwood (non-coniferous) species; nursery stock, green lumber, and other material living, dead, cut, or fallen, including logs, stumps, roots, branches, and composted and uncomposted chips of the genus *Fraxinus*. (7 CFR 301.53-2)

3 If the regulated article originates from areas quarantine for BOTH gypsy moth and emerald ash borer, use T314-a.

T314-c

### Regulated Wood Articles<sup>4</sup>

Pest: Various Wood Pests

Treatment: T314-c—Heat treatment

Unit	Temperature	Time (minutes)
°F	160.0	75
°C	71.1	75

<sup>4</sup> Regulated wood articles are considered to be unprocessed logs; lumber; any whole tree; any cut tree or any portion of a tree not solely consisting of leaves, flowers, fruits, buds, or seeds; bark; cork; laths; hog fuel; sawdust; painted raw wood products; wood mulch; wood shavings; pickets; stakes; shingles; solid wood packing materials; humus; compost; and litter. (7 CFR 319.40-1)

**Table 5-4-3 Amount of Phosphine Liberated by various Products. Calculate amount of product needed by using the amount of phosphine released as shown in the right column.**

Product	Type	Unit and weight in grams	Grams of phosphine <sup>1</sup>
Degesch Fumi-Cel®	MP	1 plate; 117.0	33.0
Degesch Fumi-Strip®	MP	16 plates; 1872.0	528.0
Degesch Phostoxin®	AP	1 tablet; 3.0	1.0
Degesch Phostoxin® Tablet Prepac Rope	AP	1 prepac; 99.0 (strip or rope of 33 tablets)	33.0
Detia	AP	1 tablet; 3.0	1.0
Detia Rotox AP	AP	1 pellet; 0.6	0.2
Detia Gas EX-B	AP	1 bag or sachet; 34.0	11.4
Fumiphos tablets	AP	1 tablet; 3.0	1.0
Fumiphos pellets	AP	1 pellet; 0.6	0.2
Fumiphos bags	AP	1 bag; 34.0	11.0
Fumitoxin	AP	1 tablet; 3.0	1.0
Fumitoxin	AP	1 pellet; 0.6	0.2
Fumitoxin	AP	1 bag; 34.0	11.0
Gastoxin	AP	1 tablet; 3.0	1.0
Gastoxin	AP	1 pellet; 0.6	0.2
"L" Fume	AP	1 pellet; 0.5	0.18
	AP	1 pellet; 0.6	0.22
Phos-Kill	AP	1 tablet; 3.0	1.1
Phos-Kill	AP	1 pellet; 0.6	0.22
Phos-Kill	AP	1 bag; 34.0	12.0

1 Reacts with moisture in the air to yield grams of phosphine.