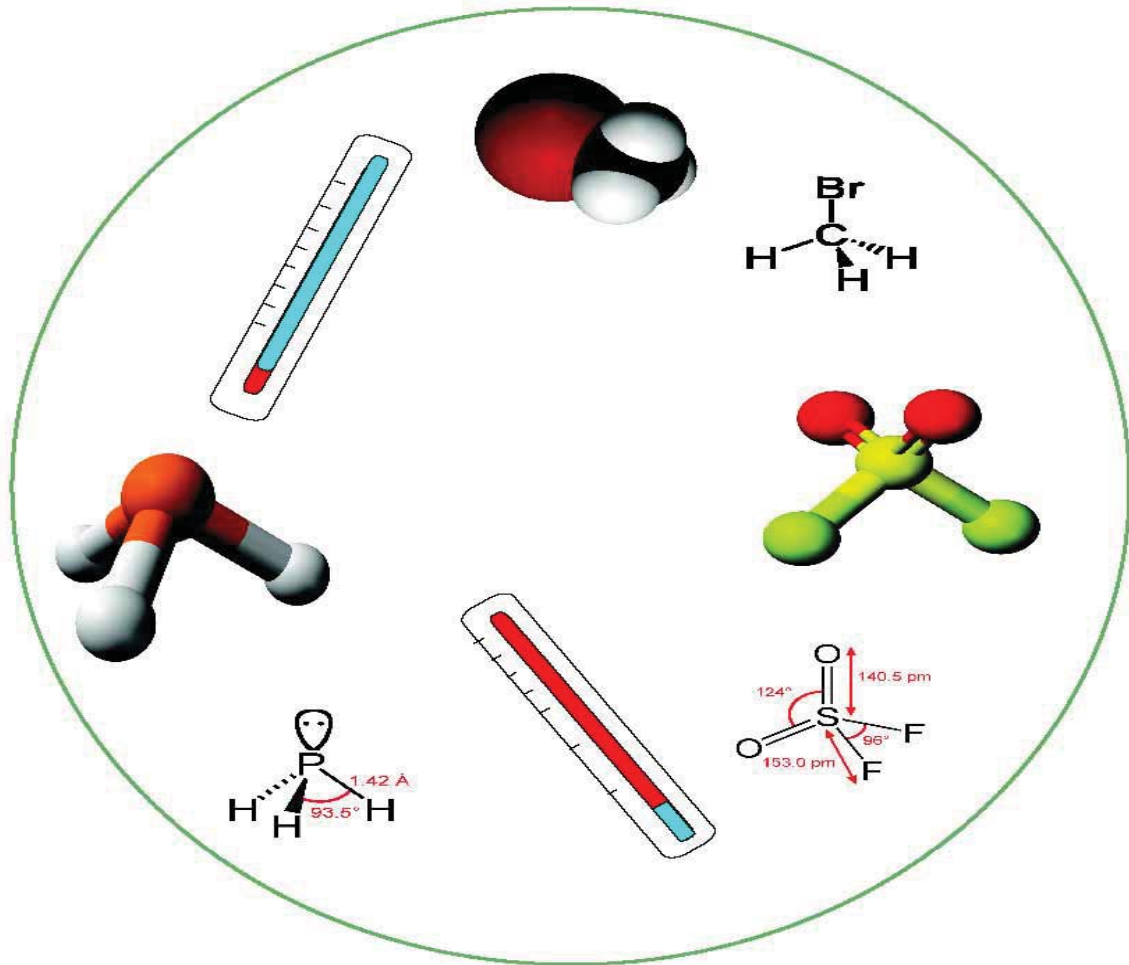




United States Department of Agriculture

# Treatment Manual



## 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.

See *Special Procedures for Adding Gas to Oak Logs Using T312 or T312-a-Alternative* on page 5-4-36 for the correct actions to take at each gas concentration reading. Refer to [Table 5-4-3](#) and [Table 5-4-4](#) 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 S&T-TMT electronic 429A and the electronic 429 database.
  - ❖ To access the 429 database go to: <https://treatments.cphst.org>
- ◆ 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 PPQ Form 429A and the electronic 429 database. Explain the reason the treatment was extended in the Remarks section.

### NOTICE

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 5-4-3](#) or [Table 5-4-4](#).

Refer to [Table 5-4-2](#) for metric equivalents for T312-a.

**Table 5-4-2 Metric Equivalents for T312-a**

Temperature (°F)	Dosage Rate (lbs/1,000 ft <sup>3</sup> )	Temperature (°C)	Dosage Rate g/m <sup>3</sup>
40 or above	15.0	4.4 or above	240

## T312-a Oak Logs

Pest: Oak wilt disease

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

Temperature (°F)	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 hrs <sup>4</sup>	36 hrs	48 hrs	72 hrs
40 and above	15.0	240	240	200	240	160	120	80

- 1 Refer to [Table 5-4-3](#) 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 hours instead of 2 hours.
- 4 After 24 hours, add enough fumigant to bring the concentration up to 240 oz.

## T312-a-Alternative Oak logs

Pest: Oak wilt disease

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

Temperature (°F)	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 and above	15.0	240	240	240	140	100

- 1 Refer to [Table 5-4-4](#) 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 hours instead of 2 hours.
- 4 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 5-4-3](#) and [Table 5-4-4](#) for actions to take during the fumigation of oak logs using T312-a or T312-a-Alternative.

Use the formula in [Figure 5-4-1](#) to calculate the amount of gas to add to the enclosure:

$$1.6 \times \text{number of ounces below minimum} \times \frac{\text{volume in cubic feet}}{1,000 \text{ cubic feet}} \times 1/16 = \text{pounds of gas to add}$$

**Figure 5-4-1 Formula for Determining the Amount of Gas to Add**

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

Refer to [Table 5-4-3](#) if using T312-a and [Table 5-4-4](#) if using T312-a-Alternative to determine how much additional time must be added to the fumigation to compensate for the low gas concentrations.

**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:

$$1.6 \times (\text{the number of ounces below } 140) \times (\text{volume in ft}^3)/1,000 \text{ ft}^3$$

ANSWER: 140-132=8

$$1.6 \times 8 \times 2400 = 30,720/1,000 = 30.72 \text{ ounces of gas to add}$$
$$30.72/16 = 1.92 \text{ pounds of gas to add}$$

Determine the amount of time to add by referring to [Table 5-4-4](#). 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 5-4-4](#).

### 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 5-4-3 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	<b>ABORT</b>
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	<b>ABORT</b>
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	<b>ABORT</b>

**Table 5-4-3 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 <b>NOT</b> 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	<b>ABORT</b>
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	<b>ABORT</b>

**Table 5-4-3 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	<b>ABORT</b>
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	<b>ABORT</b>

- 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 hours instead of 2 hours.

### **NOTICE**

If additional time has been added to the treatment, the 72 hour reading AND the extended time reading **MUST** be taken. If the minimum of 80 ounces is **not** met, time and gas **MUST** be added according to this table (Table 5-4-3).



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

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

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

0.5 hours <sup>1</sup>	121-139	1. ADD gas, and 2. DO <b>NOT</b> EXTEND EXPOSURE
	0-120	<b>ABORT</b>
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	<b>ABORT</b>
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	<b>ABORT</b>

**Table 5-4-4 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	<b>ABORT</b>
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	<b>ABORT</b>

- 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 hours instead of 2 hours.

### **NOTICE**

If additional time has been added to the treatment, the 72 hour reading AND the extended time reading **MUST** be taken. If the minimum of 100 ounces is **not** met, time and gas **MUST** be added according to this table (Table 5-4-4).

## T312-b Oak Lumber

Pest: Oak wilt disease

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

Temperature (°F)	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 hrs <sup>3</sup>	36 hrs	48 hrs
40 and above	15.0	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 hours instead of 2 hours.
- 3 After 24 hours, add enough fumigant to bring the concentration up to 240 oz.

## 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 chapter [Fumigants—Methyl Bromide—Tarpaulin Fumigation](#).

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-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.

### NOTICE

For annual facility certification guidelines, follow the procedures in [Certifying Facilities for the Heat Treatment of Firewood](#) on page 6-9-1.

## T314-a Regulated Wood Articles<sup>4</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

<sup>4</sup> 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*. (7CFR 301.53-2)

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## T314-b All logs (including firewood) from gypsy moth quarantine areas<sup>5</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

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## T314-c Regulated wood articles<sup>6</sup>

Pest: Various wood pests

Treatment: T314-c—Heat treatment

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

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<sup>5</sup> If the regulated article originates from areas quarantined for BOTH gypsy moth and emerald ash borer, use T314-a.

<sup>6</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. (7CFR 319.40-1)

## 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.

**Table 5-4-5 Amount of Phosphine Liberated by Various Products**

Product	Type	Unit and Weight in Grams	Grams of Phosphine <sup>1</sup>
Degesch Fumi-Cel <sup>®</sup>	MP	1 plate; 117.0	33.0
Degesch Fumi-Strip <sup>®</sup>	MP	16 plates; 1872.0	528.0
Degesch Phostoxin <sup>®</sup>	AP	1 tablet; 3.0	1.0
Degesch Phostoxin <sup>®</sup> 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 <sup>®</sup>	AP	1 tablet; 3.0	1.0
Fumitoxin <sup>®</sup>	AP	1 pellet; 0.6	0.2
Fumitoxin <sup>®</sup>	AP	1 bag; 34.0	11.0
Gastoxin <sup>®</sup>	AP	1 tablet; 3.0	1.0
Gastoxin <sup>®</sup>	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.