

# 5

Treatment Manual

## Treatment Schedules

### *T300 - Schedules for Miscellaneous Plant Products*

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Exposure period may be extended for any commodity which cannot be used for food or propagation. This extension is only a matter of convenience for the importer and is intended only for the purpose of reducing treatment costs. The request for extension must come from the importer or his authorized representative and should be confirmed in writing. A letter is not required for each treatment. A single blanket request should be considered as acceptable and renewed each year as required.

During the extended exposure period, the concentrations must remain stable and the prescribed minimums be met at the end of the extension. Otherwise, the treatment may be voided and retreatment required. Examples of commodities for which extended exposure periods may be approved include: cotton piece goods, baled cotton, bagging, wood, marble, soil as such, etc. Examples of commodities for which *no* extension may be approved include: cottonseed, grain, tobacco, etc. An extension of exposure period for other purposes is not permitted except as may be prescribed in various schedules for concentration readings below minimum.

Additional safety precautions, including additional aeration, may be required because of the extended exposure period. The PPQ officer or the commercial fumigator will specify any needed precautions.

## T301—Cotton and Cotton Products

### T301-a-3 Baled lint or linters

Pest: *Pectinophora* spp.

Treatment: T301-a-3—MB (“Q” label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	12 hrs	24 hrs
40 °F or above	7 lbs	84	60	30	—
OR	4 lbs	60	40	—	20

### T301-b-1-1 Baled lint, linters, waste, piece goods, gin trash

Two alternative treatments

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T301-b-1-1—MB (“Q” label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:		
		0.5 hr	2 hrs	24 hrs*
60 °F or above	8 lbs	96	64	35
40-59 °F	11 lbs	132	88	50

\*In addition to the space concentration readings, you must take a commodity concentration reading. The minimum concentration reading for commodity reading is as follows: For 60 °F or above—25 oz.; for 40-59 °F—30 oz.



**Important**

Load limit is 50 percent of chamber volume. Concentration readings may be omitted for chamber fumigations.

### T301-b-1-2 Baled lint, linters, waste, piece goods, gin trash

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T301-b-1-2—MB (“Q” label only) at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs

### T301-a-7 Cottonseed (samples and bulk)

Pest: *Pectinophora* spp.

Treatment: T301-a-7—Acid delinting and heat treatment (alternative treatment)

Cottonseed delinting is primarily intended for the elimination of surface-borne disease organisms. It is also effective against insects. To be completely effective against insects, this treatment must be carried out at approximately 145 °F (by the application of sufficient heat to the seed, or acid, or both) or by raising the temperature of the delinted seed during the subsequent drying process to 145 °F for a period of not less than 45 seconds or at least 140 °F for a period of not less than 8 minutes.



This treatment schedule is not applicable to cottonseed infested with boll weevil, *Anthonomus grandis*.

Also, this treatment largely destroys the cottonseed's ability to germinate.

## T301-b-2

### Cottonseed, cottonseed products, or samples

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T301-b-2—MB ("Q" label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:		
		0.5 hr	2 hrs	12 hrs
90 °F or above	2.5 lbs	30	20	15
80-89 °F	3.5 lbs	42	30	20

The sorptive rates of commodities vary. When a commodity is known or suspected to be sorptive, take more gas readings than normal. Additional fumigant is added as prescribed on [Special Procedures for Adding Gas and Extending Exposure Period](#) on [page 2-4-24](#).



Items known to be sorptive or items whose sorptive properties are unknown are **not** to be fumigated in chambers at NAP unless gas readings are taken.

When both woodborers and khapra beetles are involved, use schedule [T404-d](#) on [page 5-5-19](#).



Cottonseed products (other than cottonseed) treated under this schedule are **not** to be used for food or feed.

### T301-b-3

### Cottonseed meal

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T301-b-3—MB (“Q” label only) at NAP



Concentration readings should be obtained within the commodity. Concentration readings **not** required for chamber fumigations.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2 hrs	24* hrs	28* hrs	32* hrs
90 °F or above	4 lbs	48	32	25	—	—
80-89 °F	6 lbs	72	48	30	—	—
70-79 °F	8 lbs	96	64	35	—	—

\*In addition to the space concentration readings, you must take a commodity concentration reading. The minimum concentration reading for commodity reading is as follows: For 90-96 °F—10 oz.; for 80-89 °F—15 oz.; and for 70-79 °F—20 oz.

\*\*Optional



Cottonseed meal treated with this schedule is **not** to be used for food or feed.

### T301-c Cotton and cotton products

Pest: *Globodera rostochiensis* (golden nematode)

Treatment: T301-c—MB (“Q” label) at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
40 °F or above	8 lbs	16 hrs
	10.5 lbs	12 hrs

### T301-d-1-1 Cotton and cotton products

Two alternative treatments

Pest: *Anthonomus grandis* (boll weevil)

Treatment: T301-d-1-1—MB (“Q” label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2 hrs	3 hrs	4 hrs	8 hrs
90 °F or above	2.5 lbs	30	20	—	—	—
80-89 °F	3 lbs	36	28	—	—	—
70-79 °F	4 lbs	48	36	—	—	—
60-69 °F	4 lbs	50	—	34	—	—
55-59 °F	5 lbs	64	—	48	—	—
50-54 °F	5.5 lbs	70	—	—	50	—
40-49 °F	6 lbs	80	—	—	54	40

### T301-d-1-2 Cotton and cotton products

Pest: *Anthonomus grandis* (boll weevil)

Treatment: T301-d-1-2—Phosphine at NAP—tarpaulin or chamber

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ppm) At 72 hours:
50 °F or above	36 g*	225**

\*36g/1,000ft<sup>3</sup> (28.3m<sup>3</sup>) is equivalent to 1.27 g/m<sup>3</sup>.

\*\*An average reading with no reading less than 50 ppm.



Refer to the Equipment Section for a description of the MityVac pump and the Port-a-sens phosphine detector.



Refer to [Table 5-4-3](#) on [page 5-4-39](#) for data on amount of phosphine liberated by various products.

**T301-a-1-1 Lint, linters, cottonseed, cottonseed hulls, gin trash, waste, cottonseed meal, or other baled or bulk commodities (except samples)**

Pest: *Pectinophora* spp.

Treatment: T301-a-1-1—MB (“Q” label only) at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> ) for:		Exposure Period
	Bulk shipments	Other than bulk shipments	
60 °F or above	6 lbs	6 lbs	12 hrs
OR	4 lbs	3 lbs	24 hrs
40-59 °F	7 lbs	7 lbs	12 hrs
OR	5 lbs	4 lbs	24 hrs

**T301-a-1-2 Lint, linters, cottonseed, cottonseed hulls, gin trash, waste, cottonseed meal, or other baled or bulk commodities (except samples)**

Pest: *Pectinophora* spp.

Treatment: T301-a-1-2—MB (“Q” label only) in 26" vacuum—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs



For propagative seed cotton, refer to [T203-f1](#) on page 5-3-27 through [T203-f4](#) on page 5-3-28.

**T301-a-6 Lint, linters, and cottonseed (bulk, sacked, or packaged cottonseed, lint or linters, cottonseed hulls, gin trash, and all other baled or bulk cotton commodities)**

Pest: *Pectinophora* spp.

Treatment: T301-a-6—Phosphine at NAP

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ppm) At:	
		72 hrs	120 hrs
50 °F or above	60 g*	225**	50***

\* 60 g/1,000ft<sup>3</sup> (28.3m<sup>3</sup>) is equivalent to 2.1g/m<sup>3</sup>.  
\*\* An average reading with no reading less than 50 ppm.  
\*\*\*An average of 50 PPM or more.

Aerate commodity 24 hours and/or make appropriate tests for presence of gas.



Refer to [Table 5-4-3](#) on [page 5-4-39](#) for data on amount of phosphine liberated by various products.  
Refer to [Equipment](#) on [page 8-1-1](#) for a description of the MityVac pump and the Port-a-sens phosphine detector.

### T301-a-2

#### Lint (except baled lint or linters), cottonseed (except packaged cottonseed), cottonseed hulls, gin trash, waste, cottonseed meal, or other baled or bulk commodities (excluding samples)

Pest: *Pectinophora* spp.

Treatment: T301-a-2—MB (“Q” label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	12 hrs	24 hrs
40 °F or above	7 lbs	84	60	30	—
OR	5 lbs	60	40	—	20

### T301-a-4

#### Packaged cottonseed

Pest: *Pectinophora* spp.

Treatment: T301-a-4—MB (“Q” label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	12 hrs	24 hrs
40 °F or above	7 lbs	84	60	30	—
OR	5 lbs	60	40	—	20

### T301-a-5-1

#### Samples of cotton and cotton products

Two alternative treatments

Pest: *Pectinophora* spp.

Treatment: T301-a-5-1—MB at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
40 °F or above	3 lbs	24 hrs

### T301-a-5-2

#### Samples of cotton and cotton products

Pest: *Pectinophora* spp.

Treatment: T301-a-5-2—MB in 26" vacuum—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
40 °F or above	4 lbs	2 hrs

## T302—Grains and Seeds Not Intended for Propagation



Important

If grain and seeds **are for propagation**, use appropriate treatment in T203 schedules

### T302-g-1

#### Acorns not intended for propagation

Two alternative treatments

Pest: *Cydia splendana* (nut fruit tortrix) and *Curculio* spp. (weevils)

Treatment: T302-g-1—MB at NAP—tarpaulin, chamber, or van container

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:					
		0.5 hr	2 hrs	3 hrs	4 hrs	5 hrs	6 hrs
90-95 °F	4 lbs	58	32	34	—	—	—
80-89 °F	4 lbs	58	32	—	34	—	—
70-79 °F	5 lbs	72	40	—	42	—	—
60-69 °F	5 lbs	72	40	—	—	40	—
50-59 °F	6 lbs	85	48	—	—	50	—
40-49 °F	6 lbs	85	48	—	—	—	48

### T302-g-2

#### Acorns not intended for propagation

Pest: *Cydia splendana* (nut fruit tortrix) and *Curculio* spp. (weevils)

Treatment: T302-g-2—MB in 26" vacuum—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80-96 °F	3 lbs	2 hrs
70-79 °F	4 lbs	2 hrs
60-69 °F	4 lbs	3 hrs
50-59 °F	4 lbs	4 hrs
40-49 °F	4 lbs	5 hrs



Important

Either T302-g-1 or T302-g-2 required from all countries except Canada and Mexico. Treated commodity **not** to be used for food or feed.

### T302-a-1-1

#### Ear corn

Two alternative treatments

Pest: Borers

Treatment: T302-a-1-1—MB at NAP—chamber only

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
70 °F or above	2 lbs	6 hrs

### T302-a-1-2

#### Ear corn

Pest: Borers

Treatment: T302-a-1-2—Dry heat

168 °F minimum air temperature for not less than 2 hours; ears spread in single layers on slats or wire shelves.

### T302-c-1

#### Grains and seeds not intended for propagation (e.g., guar “gum”)

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T302-c-1—MB (“Q” gas only) at NAP—tarpaulin.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:		
		0.5 hr	2 hrs	12 hrs
90 °F or above	2.5 lbs	30	20	15
80-89 °F	3.5 lbs	42	30	20
70-79 °F	4.5 lbs	54	40	25
60-69 °F	6 lbs	72	50	30
50-59 °F	7.5 lbs	90	60	35
40-49 °F	9 lbs	108	70	40

The sorptive rates of commodities vary. When a commodity is known or suspected to be sorptive (see [T307-a](#) on [page 5-4-21](#)), take more gas readings than normal. Additional fumigant is added as prescribed on [Aerating Sorptive Commodities in Containers—Indoors and Outdoors](#) on [page 2-4-45](#).



Important

Items known to be sorptive or items whose sorptive properties are unknown are **not** to be fumigated in chambers at NAP unless gas readings are taken.

When both woodborers and khapra beetles are involved, use schedule [T404-d](#) on [page 5-5-19](#).

### T302-c-2

#### Grains and seeds not intended for propagation(e.g., guar “gum”)

NOTE: Load limit is 75 percent of chamber volume.

Pest: *Trogoderma granarium* (khapra beetle)  
Treatment: T302-c-2—MB (“Q” label gas) in 26” vacuum—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs

### T302-c-3

#### Grains and seeds not intended for propagation (e.g., guar “gum”)

Pest: *Trogoderma granarium* (khapra beetle)  
Treatment: T302-c-3—MB (“Q” gas only) in 26” NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
90-96 °F	2.5 lbs	12 hrs
80-89 °F	3.5 lbs	12 hrs
70-79 °F	4.5 lbs	12 hrs
60-69 °F	6 lbs	12 hrs
50-59 °F	10 lbs	12 hrs
40-49 °F	12 lbs	12 hrs

The sorptive rates of commodities vary. When a commodity is known or suspected to be sorptive (see [T307-a](#) on [page 5-4-21](#)), take more gas readings than normal. Additional fumigant is added as prescribed on [Special Procedures for Adding Gas and Extending Exposure Period](#) on [page 2-4-24](#).



Items known to be sorptive or items whose sorptive properties are unknown are **not** to be fumigated in chambers at NAP unless gas readings are taken.

When both woodborers and khapra beetles are involved, use schedule T404-d.

### T302-d

#### Grains and seeds not intended for propagation and contaminated with cottonseed

Pest: *Pectinophora* spp.  
Treatment: See Cotton and Cotton Products, [T301-a-1-1](#) on [page 5-4-6](#) or [T301-a-1-2](#) on [page 5-4-6](#).



Alternate method—screening for removal of cotton seed contamination.

### T302-e-1 Grains and seeds not intended for propagation

Two alternative treatments

Pest: Insects other than *Trogoderma granarium* (khapra beetle)

Treatment: T302-e-1—MB (“Q” label only) at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80-96 °F	2.5 lbs	2.5 hrs
70-79 °F	3 lbs	2.5 hrs
60-69 °F	3 lbs	3 hrs
50-59 °F	3 lbs	3.5 hrs
40-49 °F	3 lbs	4 hrs

### T302-e-2 Grains and seeds not intended for propagation

Pest: Insects other than *Trogoderma granarium* (khapra beetle)

Treatment: T302-e-2—MB (“Q” label only) at 26" vacuum—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80-96 °F	2.5 lbs	2.5 hrs
70-79 °F	3 lbs	2.5 hrs
60-69 °F	3 lbs	3 hrs
50-59 °F	3 lbs	3.5 hrs
40-49 °F	3 lbs	4 hrs



Load limit is 50 percent of chamber volume. This vacuum treatment primarily for material so packed or packaged as to make fumigant penetration questionable.

### T302-f Grains and seeds (excluding Rosmarinus seed) not intended for propagation

Pest: Snails

Treatment: T302-f—Mechanical separation by screening or hand removal. If **not** feasible, entry should be denied when snails are of agricultural or public health significance, or treat using appropriate schedule as listed in T403-a.



For *Rosmarinus* seed use [T203-h](#) on [page 5-3-30](#)

**T302-b-1-1 Shelled corn**

Treatment: T302-b-1-1 **Reserved**

**T302-b-1-2 Shelled corn contaminated with cottonseed**

Pest: *Pectinophora* spp.

Treatment: T302-b-1-2



See [T301-a-1-1](#) on page 5-4-6 or [T301-a-1-2](#) on page 5-4-6



Shelled corn treated with T301 is **not** to be used for food or feed.

## T303—Rice

### T303-a-1

#### Rice (*Oryza spp.*)<sup>1</sup> seed



**Important**

T303-a-1,-2,-3 are to be used for:

- ◆ Rice seed moving interstate from Puerto Rico
- ◆ Rice seed harvested from greenhouses under Emergency Action Notice for Panicle Rice Mite

The yellow color of these three alternative treatments indicates that the authority to conduct the treatment comes from the Federal Order for Panicle Rice Mite DA-2008-29 and is pending regulatory approval.

Treatment: T303-a-1 Phosphine

Pest: Panicle Rice Mite (*Steneotarsonemus spinki*)

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ppm) At:		
		24 hrs	48 hrs	72 hrs
68 °F or above	30-90 <sup>1</sup> g	350	350	350

1 25 ppm = 1 g/1000 ft<sup>3</sup> of phosphine liberated



**Important**

If any of the required minimum concentration readings are **not** met, the treatment must be ABORTED. However, phosphine gas may be added to prevent failure if a previous successful reading indicates the minimum will most likely **not** be met for a subsequent reading. Any addition of gas **MUST** occur immediately after a successful reading is recorded. **DO NOT** add time.

### T303-a-2

#### Rice (*Oryza spp.*)<sup>1</sup> seed

Treatment: T303-a-2 MB at NAP

Pest: Panicle Rice Mite (*Steneotarsonemus spinki*)

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:		
		0.5 hr	2 hrs	12 hrs
80 °F or above	1.25 lbs	15	12	10



**Important**

Depending on seed moisture content, fumigation with methyl bromide will result in reduced seed germination. Inform the importer and obtain a waiver of PPQ liability if MB treatment is used.

1 Including, but **not** limited to, *O.sativa* (cultivated paddy rice) and *O.latifolia* (weedy red rice) and *Cyperus iria*.

### T303-a-3 Rice (*Oryza spp.*)<sup>2</sup> seed

Treatment: T303-a-3 Cold treatment

Pest: Panicle Rice Mite (*Steneotarsonemus spinki*)

Temperature	Time (hrs)
17.6 °F (-8 °C)	72

Treat rice seed at 17.6 °F (-8 °C) for a minimum of 72 hours. This treatment is feasible for small-scale seed treatments.

### T303-d-1 Articles made with rice straw

Two alternative treatments

Pest: Fungous diseases of rice or internal feeders

Treatment: T303-d-1—Dry heat at 180-200 °F for 2 hours

### T303-d-2 Articles made with rice straw

Pest: Fungous diseases of rice or internal feeders

Treatment: T303-d-2—Steam sterilization

Temperature	Pressure	Exposure Period
260 °F	20 lbs	15 minutes
250 °F	15 lbs	20 minutes

### T303-d-2-1 Articles made with rice straw

Pest: Fungous diseases of rice or internal feeders

Treatment: T303-d-2-1—Steam sterilization, use [T303-b-1](#) on **page 5-4-15**

### T303-d-2-3 Articles made with rice straw for indoor use only

Pest: Internal feeders

Treatment: T303-d-2-3—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 hrs	4 hrs	24 hrs
60 °F or above	2.5 lbs	30	20	20	15
50-59 °F	3 lbs	36	25	24	20
40-49 °F	4 lbs	48	35	32	25

2 Including, but **not** limited to, *O.sativa* (cultivated paddy rice) and *O.latifolia* (weedy red rice) and *Cyperus iria*.

**T303-d-2-2**

**Articles made with rice straw for indoor use only**

Pest: Internal feeders

Treatment: T303-d-2-2—MB (“Q” label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	2.5 lbs	2.5 hrs
50-59 °F	3.5 lbs	2.5 hrs
40-49 °F	5 lbs	2.5 hrs

**T303-b-1**

**Rice straw and hulls imported for purposes other than approved processing**

Two alternative treatments based on how commodity is packed

Pest: Fungous diseases of rice

Treatment: T303-b-1—Steam sterilization, for closely packed commodity

Introduce the live steam into a 28" vacuum until pressure reaches 10 lbs and hold for 20 minutes. (Steam sterilization is **not** practical for the treatment of bales having a density greater than 30 lbs. per cubic foot.)

**T303-b-2**

**Rice straw and hulls imported for purposes other than approved processing**

Pest: Fungous diseases of rice

Treatment: T303-b-2—Steam sterilization, for commodity packed as loose masses

Use **T303-b-1** on **page 5-4-15** or, if without initial vacuum, bleed air until steam vapor escapes.

**T303-c-1**

**Rice straw and hulls imported in small lots of 25 lbs. or less**



T303-c-1 is suspended until further notice. (01-14-08)

Pest: Fungous diseases of rice

Treatment: T303-c-1—Dry heat at 212 °F for 1 hour

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## **T304—Alpha (alfa) Grass and Handicrafts (*Stipa tenacissima*, *Ampelodesma mauritanicus*)**

### **T304-a                    Alpha (alfa) grass and handicrafts (*Stipa tenacissima*, *Ampelodesma mauritanicus*)**

Two alternative treatments

Pest:            Infested with *Harmolita* spp. (jointworms)

Treatment: T304-a—MB at NAP—chamber only

<b>Temperature</b>	<b>Dosage Rate (lb/1,000 ft<sup>3</sup>)</b>	<b>Exposure Period</b>
60 °F or above	2.5 lbs	32 hrs
50-59 °F	3.5 lbs	32 hrs
40-49 °F	4.5 lbs	32 hrs

### **T304-b                    Alpha (alfa) grass and handicrafts (*Stipa tenacissima*, *Ampelodesma mauritanicus*)**

Treatment: T304-b—MB in 26" vacuum

<b>Temperature</b>	<b>Dosage Rate (lb/1,000 ft<sup>3</sup>)</b>	<b>Exposure Period</b>
60 °F or above	2.5 lbs	2.5 hrs
50-59 °F	3.5 lbs	2.5 hrs
40-49 °F	5 lbs	2.5 hrs

## T305—Cut Flowers and Greenery

### T305-a Cut flowers and greenery



Important

The “external pests” controlled by this schedule do **not** include dormant snails. Refer to [T201-o-1](#) on [page 5-3-12](#) through [T201-p-3](#) on [page 5-3-19](#).

Pest: External feeders, leafminers, hitchhikers, surface pests, and slugs<sup>3</sup>

Treatment: T305-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 hrs
80-89 °F	1.5 lbs	19	12
70-79 °F	2 lbs	24	16
60-69 °F	2.5 lbs	30	20
50-59 °F	3 lbs	36	24
40-49 °F*	3.5 lbs	41	27

\* For leafminers, use the initial dosage rate of 4 lbs/1,000 ft<sup>3</sup>.

### T305-b Cut flowers and greenery

Pest: Borers or soft scales

Treatment: T305-b—MB (“Q” label only) in 15" vacuum



Important

Vacuum fumigation requires prior consent of the importer. If consent denied, refuse entry unless T305-a plus hand removal of these pests is feasible. Vacuum fumigation is **not** required for soft scales known to be widely distributed in the U.S.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80-90 °F	2.5 lbs	2 hrs
70-79 °F	3 lbs	2 hrs
60-69 °F	3 lbs	2.5 hrs
50-59 °F	3 lbs	3 hrs
40-49 °F	3 lbs	3.5 hrs

<sup>3</sup> Quarantine significant slugs of the families Agriolimacidae, Arionidae, Limacidae, Milacidae, Philomycidae, and Veronicellidae, including the following genera:  
Agriolimax, Arion, Colosius, Deroceras, Diplosolenodes, Leidyula, Limax, Meghimatium, Milax, Pallifera, Pseudoveronicella, Sarasinula, Semperula, Vaginulus, Veronicella  
Slugs must be treated at 60 °F or above (2.5 lbs. or greater)

### T305-c Cut flowers and greenery

Pest: Mealybugs

Treatment: T305-c—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 hrs
80 °F or above	2.5 lbs	32	24
70-79 °F	3 lbs	38	29
60-69 °F	4 lbs	48	38

### T306—Bags and Bagging Material, Covers

#### T306-a Bags and bagging material or covers used to contain root crops

Pest: *Globodera rostochiensis* (golden nematode)

Treatment: T306-a—MB (“Q” label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
40 °F or above	8 lbs	16 hrs
	10.5 lbs	12 hrs
	16 lbs	8 hrs

#### T306-b Bags and bagging material or covers used for cotton only

Pest: *Pectinophora* spp.

Treatment: T306-b—MB at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> ) for:		Exposure Period
	Bulk shipments	Other than bulk shipments	
60 °F or above	6 lbs	6 lbs	12 hrs
60 °F or above	4 lbs	3 lbs	24 hrs
40-59 °F	7 lbs	7 lbs	12 hrs
40-59 °F	5 lbs	4 lbs	24 hrs

### T306-c-1 Bags and bagging material or covers

Two alternative treatments

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T306-c-1—MB (“Q” label only) at NAP



Concentration readings should be obtained within the commodity.  
Concentration readings **not** required for chamber fumigations.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2 hrs	24 <sup>1</sup> hrs	28 <sup>1</sup> hrs	32 <sup>1</sup> hrs
90 °F or above	4 lbs	48	32	25	—	—
80-89 °F	6 lbs	72	48	30	—	—
70-79 °F	8 lbs	96	64	35	—	—
60-69 °F	12 lbs	144	96	50	—	—
50-59 °F	12 lbs	144	96	50	50	—
40-49 °F	12 lbs	144	96	50	50 <sup>2</sup>	50

- 1 In addition to the space concentration readings, commodity concentration reading must be taken. The minimum concentration reading for commodity reading is as follows: For 90-96 °F—10 oz.; for 80-89 °F—15 oz.; and for 70-79 °F—20 oz.
- 2 Optional

### T306-c-2 Bags and bagging material or covers

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T306-c-2—MB (“Q” label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs

### T306-d-1 Bagging from unroasted coffee beans

Two alternative treatments

Pest: Various

Treatment: T306-d-1—MB (“Q” label only) at NAP



**Important**

Concentration readings should be obtained within the commodity.  
 Concentration readings **not** required for chamber fumigations.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2 hrs	24* hrs	28* hrs	32* hrs
90 °F or above	4 lbs	48	32	25	—	—
80-89 °F	6 lbs	72	48	30	—	—
70-79 °F	8 lbs	96	64	35	—	—
60-69 °F	12 lbs	144	96	50	—	—
50-59 °F	12 lbs	144	96	50	50	—
40-49 °F	12 lbs	144	96	50	50	50

\*In addition to the space concentration readings, you must take a commodity concentration reading. The minimum concentration reading for commodity reading is as follows: For 90-96 °F—10 oz.; for 80-89 °F—15 oz.; and for 70-79 °F—20 oz.

### T306-d-2 Bagging from unroasted coffee beans

Two alternative treatments

Pest: Various

Treatment: T306-d-2—MB (“Q” label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs



**Important**

Load limit maximum 75 percent of chamber volume.

## T307—Khapra Beetle Infested Material

### T307-a

#### Feeds and milled products heated as a part of the processing procedure, or other commodities that can be subjected to heat

Pest: Khapra beetle

Treatment: T307-a—Heat treatment



This treatment should **not** be used except when specifically authorized in each case by the Quarantine Policy, Analysis and Support (QPAS), Riverdale, MD, office.

180 °F in any part of a processing procedure or at 150 °F for a total of 7 minutes, the commodity being moved through or manipulated in the heated area in a manner to ensure that all parts meet the time and temperature requirements.

#### Miscellaneous products infested with Khapra beetle

Pest: Khapra beetle

Treatment: Summary of fumigation treatments for infested material



Bags and bagging, see [T306-c-1](#) on [page 5-4-19](#)  
Cotton products, see [T301-b-1-1](#) on [page 5-4-2](#)  
Finely ground oily meals, see [T306-c-1](#) on [page 5-4-19](#)  
Grains and seeds, see [T302-c-1](#) on [page 5-4-9](#)  
Flour, see [T306-c-1](#) on [page 5-4-19](#)  
Sorptive materials, see [T302-g-1](#) on [page 5-4-8](#).  
Goatskins, lambskins, sheepskins (skins and hides), see “T416” on [T416—Goatskins, Lambskins, Sheepskins \(Skins and Hides\)](#) on [page 5-5-45](#)



The following commodities have shown relatively high sorption:  
Carpet backing, Cinnamon quill, Cocoa mats, Cocoa powder, Lumber, Myrobalan, Pistachio nuts, Polymide waste, Potato starch, Rubber (crepe or crude) Vermiculite, Wool (raw, except pulled)

All other commodities, see [T302-g-1](#) on [page 5-4-8](#)

## T308—Tobacco, for Export

### T308-e Blended strip tobacco for export

Pest: *Lasioderma serricorne* (Cigarette beetle) and *Ephestia elutella* (Tobacco moth)

Treatment: T308-e—Vacuum-steam flow method

1. Evacuate the chamber to the wet bulb temperature of 35 °F (0.2 in. Hg. absolute or 29.8 in. Hg. vacuum) to remove air from the tobacco mass and facilitate steam penetration.
2. Introduce steam until 160 °F is reached while maintaining vacuum to evacuate gases pushed ahead of the steam. Hold at 160 °F for 3 minutes to allow the steam to condense within the tobacco mass for the temperature to equilibrate.
3. Re-evacuate to 110 °F.
4. Introduce steam to 135 °F for 3 minutes to allow the steam to condense within the tobacco mass and for the temperature to equilibrate.

### T308-c Leaf tobacco for export

Pest: *Lasioderma serricorne* (cigarette beetle) and *Ephestia elutella* (tobacco moth)

Treatment: T308-c—Vacuum-steam flow process followed by reconditioning

For leaf tobacco—flowing steam at 170 °F for 15 minutes in 23" vacuum. Followed by reconditioning of the tobacco to 12 to 13 percent moisture content.

### T308-d Stored tobacco for export

Pest: *Lasioderma serricorne* (cigarette beetle) and *Ephestia elutella* (tobacco moth)

Treatment: T308-d—Kabat<sup>®</sup> (active ingredient—methoprene) is an insect growth regulator applied at the rate of 0.2 lbs. (3.9 fluid oz.) per 1,000 lbs. of tobacco.

Application should be made directly to tobacco immediately prior to compaction in hogsheads. Assure complete coverage by using multi-directional sprays and tumbling. Kabat<sup>®</sup> may be applied by use of a proportional dilution apparatus or by preparation of a dilute spray solution. Follow mixing and application instructions on the label. Zoecon Corporation will be responsible for ensuring that receivers in foreign countries will accept this treatment in lieu of fumigation.

In most cases, indication of Kabat® treatment need not be shown on the phytosanitary certificate. PPQ prefers that tobacco exporting firms utilize the letterhead certification of treatment rather than relying on the phytosanitary certificate to convey this information to foreign receivers. However, if requested, an additional declaration may be made showing application rates as supplied by the exporter if it has been determined through periodic inspection of a firm's facilities that application of the protectant is an integral part of the processing procedure.

**T308-a-1**

**Tobacco for export (flue-cured and burley in hogshead and cases; turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales)**

Four alternative treatments

Pest: *Lasioderma serricorne* (cigarette beetle) and *Ephestia elutella* (tobacco moth)

Treatment: T308-a-1—MB in 28" vacuum

Flue-cured and burley in hogshead and cases; Turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
70 °F or above	4 lbs	4 hrs

**T308-a-2**

**Tobacco for export (flue-cured and burley in hogshead and cases; turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales)**

Treatment: T308-a-2—MB at NAP—tarpaulin or chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
70 °F or above	1.25 lbs	72 hours
45-69 °F	2 lbs	72 hrs

**T308-b-1 Tobacco for export (flue-cured and burley in hogshead and cases; turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales)**

Treatment: T308-b-1—Phosphine at NAP—Tarpaulin or freight containers

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ppm) At:	
		96 hrs	144 hours
Greater than 68 °F	33 g*	200	—
61-68 °F	33 g*	—	300

\* 33g/1,000 ft<sup>3</sup> is equivalent to 1.17 g/m<sup>3</sup>.



The tobacco industry's Sanitation Committee considers “starting time” as the time when the minimum concentration reading is reached. It is recommended that concentration monitoring be done every 6 hours leading up to “starting time,” then again at completion (96 or 120 hours later). [Note that this concept differs from the “starting time” in other phosphine fumigation schedules. In those cases, “starting time” starts when the aluminum phosphide or magnesium phosphide are first introduced.]



Gas concentration readings and temperature readings must be taken in the middle of a tightly packed bale. The fumigation does **not** begin until the gas concentration readings reach minimum required levels.



Refer to the Equipment Section of this manual for a discussion of the MityVac hand-operated gas sampling pump and the Port-a-sens phosphine monitor. See [Table 5-4-3](#) on [page 5-4-39](#) for data on amount of phosphine liberated by various products.

**T308-b-2 Tobacco for export (flue-cured and burley in hogshead and cases; turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales)**

Treatment: T308-b-2—Phosphine at NAP—Warehouses

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ppm) At:	
		96 hrs	144 hours
Greater than 68 °F	20 g*	200	—
61-68 °F	20 g*	—	300

\* 20g/1,000 ft<sup>3</sup> is equivalent to 0.71 g/m<sup>3</sup>.



The tobacco industry's Sanitation Committee considers “starting time” as the time when the minimum concentration reading is reached. It is recommended that concentration monitoring be done every 6 hours leading up to “starting time,” then again at completion (96 or 120 hours later). [Note that this concept differs from the “starting time” in other phosphine fumigation schedules. In those cases, “starting time” starts when the aluminum phosphide or magnesium phosphide are first introduced.]



Gas concentration readings and temperature readings must be taken in the middle of a tightly packed bale. The fumigation does **not** begin until the gas concentration readings reach minimum required levels.



Refer to [Table 5-4-3](#) on [page 5-4-39](#) for the amount of phosphine liberated by various products

## T309—Broomcorn and Broomcorn Articles

### T309-a

#### Broomcorn and broomcorn articles

Four alternative schedules

Pest: *Ostrinia nubilalis* (European corn borers), ticks, and saw flies

Treatment: T309-a—MB in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period for:	
		Sawflies	Other than sawflies
60 °F or above	2.5 lbs	5 hrs	2.5 hrs
50-59 °F	3.5 lbs	5 hrs	2.5 hrs
40-49 °F	5 lbs	5 hrs	2.5 hrs

### T309-b-1

#### Broomcorn and broomcorn articles

Pest: *Ostrinia nubilalis* (European corn borers), ticks, and saw flies

Treatment: T309-b-1—MB at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	2.5 lbs	16 hrs
50-59 °F	3.5 lbs	16 hrs
40-49 °F	4.5 lbs	16 hrs

### T309-b-2 Broomcorn and broomcorn articles

Pest: *Ostrinia nubilalis* (European corn borers), ticks, and saw flies

Treatment: T309-b-2—MB at NAP—Railroad car, reefer, highway van, tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	4 hrs	24 hrs
60 °F or above	3 lbs	36	24	20	15
50-59 °F	5 lbs	60	40	30	20
40-49 °F	7 lbs	84	56	40	25

### T309-c Broomcorn and broomcorn articles

Pest: *Ostrinia nubilalis* (European corn borers), ticks, and saw flies

Treatment: T309-c—Steam sterilization (alternate treatment)

Introduce live steam into 25" vacuum until pressure reaches 10 psi and 240 °F, then hold for 20 minutes.

## T310—Tick-Infested Materials (Nonfood)

### T310-a Nonfood materials

Three alternative treatments

Pest: Ticks

Treatment: T310-a—MB (“Q” label only) at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:							
		0.5 hr	2 hrs	3 hrs	4 hrs	5 hrs	7 hrs	8 hrs	16 hrs
90 °F or above	4 lbs	55	32	45	—	—	—	—	—
80-89 °F	5 lbs	65	40	52	—	—	—	—	—
70-79 °F	6 lbs	75	48	—	50	—	—	—	—
60-69 °F	7 lbs	88	56	—	—	60	—	—	—
50-59 °F	8 lbs	100	64	—	—	—	70	—	—
40-49°F	8 lbs	100	—	—	—	—	—	65	50



Always check the fumigant label for the proper dosage used on the commodity being treated.

**T310-b**

**Nonfood materials**

Treatment: T310-b—MB (“Q” label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80 °F or above	3 lbs	2.5 hrs
70-79 °F	3 lbs	3.5 hrs
60-69 °F	4 lbs	4 hrs
50-59 °F	5.5 lbs	5 hrs



**Important**

For all fumigations with MB, if commodity temperature is known or considered to have been below the temperature range during the previous 48 hours, use the next lower range to calculate dosage.

**T310-c**

**Nonfood materials**

Treatment: T310-c (***Vacant***)

**T310-d**

**Nonfood materials**

Treatment: T310-d—Sulfuryl fluoride at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:		
		0.5 hr	2 hrs	24 hrs
70 °F or above	2 lbs	25	16	20
50-69 °F	2.5 lbs	32	20	24
40-49 °F	3 lbs	40	24	28



**Important**

Fumigations below 50 °F to be used only on an emergency basis and specifically authorized by Quarantine Policy, Analysis and Support (QPAS) in Riverdale MD.

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## T311—Hay, Baled

### T311 Baled hay

Pest: *Mayetiola destructor* (Hessian fly), *Oulema melanopus* (cereal leaf beetle)

Treatment: T311 Phosphine at NAP

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	24 hrs	168 hrs
50 °F or above	60	45	30	15	15

Aerate 24 hours or until a level at or below 0.3 ppm is determined.

See [Table 5-4-3](#) on [page 5-4-39](#) for data on amount of phosphine liberated by various products.

## 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-2-4-30** 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-2-4-31** and **Table 2-4-9 on page-2-4-34**) 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 2-4-45** and ***Aerating Sorptive, Noncontainerized Cargo—Indoors and Outdoors*** on **page 2-4-43**.
- ◆ 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.



Important

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-2-4-31** or **Table 2-4-9 on page-2-4-34** in the section “Special Procedures for Adding Gas to Oak Logs Using T312-a or T312-a-Alternative” on **page-2-4-30**.

### 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	2 hrs	12 hrs	24 hrs	36 hrs	48 hrs	72 hrs
40 °F or above	15 lbs	240	240	200	120	160	120	80

1 Refer to [Table 5-4-1](#) for adding gas at each reading.

### 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	2 hrs	24 hrs	48 hrs	72 hrs
40 °F or above	15 lbs	240	240	140	140	100

1 Refer to [Table 5-4-2](#) for adding gas at each reading.

### 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 hrs	2 hrs	12 hrs	24 <sup>1</sup> hrs	36 hrs	48 hrs
40 °F or above	15 lbs	240	160	100	40	120	80

1 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 x (the number of ounces below 140) x (volume in ft<sup>3</sup>)/1000 ft<sup>3</sup>

ANSWER:  
140-132=8  
1.6 x 8 x 2400=30,720/1000 = 30.72 ounces of gas to add  
30.72/16 = 1.92 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**

If the Reading is Taken At:	And the lowest individual concentration reading is:	Then:
0.5 hour	121-239	1. ADD gas, and 2. EXTEND exposure by 0.5 hour
	0-120	ABORT
2 hours	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)**

<b>If the Reading is Taken At:</b>	<b>And the lowest individual concentration reading is:</b>	<b>Then:</b>
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 5-4-1 Determine Gas Concentration Values and Corrections for Oak Log Fumi-  
gations using Schedule T312-a (continued)**

<b>If the Reading is Taken At:</b>	<b>And the lowest individual concentration reading is:</b>	<b>Then:</b>
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>
<div style="display: flex; align-items: center;">  <div style="background-color: #e0f2f1; padding: 10px; border: 1px solid #ccc;"> <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> <p><b>Important</b></p>		


## 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**

If the Reading is Taken At:	And the any individual concentration reading is:	Then:
0.5 hours	121-239	1. ADD gas, and 2. DO <b>NOT</b> EXTEND exposure.
	0-120	<b>ABORT</b>
2 hours	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 <b>240</b> 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 5-4-2 Determine Gas Concentration Values and Corrections for Oak Log Fumigations using schedule T312-a-Alternative (continued)**

<b>If the Reading is Taken At:</b>	<b>And the any individual concentration reading is:</b>	<b>Then:</b>
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>
<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>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.</p> </div> </div>		

## 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-2-4-15](#).

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](#).

### T314-a

#### **Fraxinus (Ash Logs, including 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	160.0	75
°C	71.1	75

### T314-b

#### **All logs (including firewood) from Gypsy Moth quarantine areas**

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

Treatment: T314-b—Heat treatment

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

**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 *
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

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

