

# 5

Treatment Manual

## Treatment Schedules

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

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**Important**

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<br>(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<br>(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% 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<br>(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<br>(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



**Important**

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

| Temperature   | Dosage Rate<br>(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



**Important**

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<br>(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<br>(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.



Important

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



Important

Refer to [Table 5-4-1](#) on [page 5-4-30](#) 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

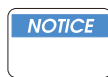
| Temperature   | Dosage Rate (lb/1,000 ft <sup>3</sup> ) for: |                           | Exposure Period |
|---------------|--|---------------------------|-----------------|
|               | Bulk shipments                               | Other than bulk shipments |                 |
| 60°F or above | 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-f-1](#) on **page 5-3-28** through [T203-f-4](#) on **page 5-3-29**.

**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 5-4-1](#) on **page 5-4-30** 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 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 5-4-19](#)), 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% 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 5-4-19](#)), 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 cotton seed

Pest: *Pectinophora* spp.

Treatment: See Cotton and Cotton Products, [T301-a-1-1](#) on [page 5-4-5](#) 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           |



Important

Load limit is 50% 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.



Important

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



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

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**T303—Rice Straw and Hulls**

**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 5-4-13](#)

**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     |

**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 5-4-13](#) 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

**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

| Temperature   | Dosage Rate (lb/1,000 ft <sup>3</sup> ) | Exposure Period |
|---------------|---|-----------------|
| 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

| 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         |

## 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 5-3-20](#).

Pest: External feeders, leafminers, hitch-hikers, surface pests, and slugs<sup>1</sup>

Treatment: T305-a—MB (“Q” label only) at NAP—tarpaulin or chamber

| Temperature | Dosage Rate<br>(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.

1 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)

| 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         |

### 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



**Important**

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

| Temperature   | Dosage Rate<br>(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<br>(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<br>(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<br>(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% 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



Important

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



Important

Bags and bagging, see [T306-c-1 on page 5-4-17](#)  
Cotton products, see [T301-b-1-1 on page 5-4-2](#)  
Finely ground oily meals, see [T306-c-1 on page 5-4-17](#)  
Grains and seeds, see [T302-c-1 on page 5-4-9](#)  
Flour, see [T306-c-1 on page 5-4-17](#)  
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](#)



Important

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% 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<sup>®</sup> 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>.



**Important**

The tobacco industry's Sanitation Committee wants to consider "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 5-4-1](#) on [page 5-4-30](#) 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)**

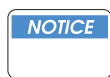
Treatment: T308-b-2—Phosphine at NAP—Warehouses

| Temperature       | Dosage Rate<br>(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 wants to consider "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 5-4-1](#) on [page 5-4-30](#) 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<br>(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<br>(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<br>(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           |



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<br>(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     |



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.

## T311—Hay, Baled

### T311

#### Baled hay

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

Treatment: T311 Phosphine at NAP

| Temperature   | Dosage Rate<br>(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 5-4-1](#) on [page 5-4-30](#) 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 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<sup>®</sup> and Ascarite<sup>®</sup> during the fumigation. Replace the DriRite<sup>®</sup> when it changes color from blue to pink. Replace the Ascarite<sup>®</sup> 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 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-2-4-31](#) or [Table 2-4-9 on page-2-4-34](#) in the section “Special Procedures for Adding Gas to Oak Logs Using T312 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<br>(lb/1,000 ft <sup>3</sup> ) | Minimum Concentration Readings (ounces) At: |          |           |                        |           |           |           |
|---------------|--|---|----------|-----------|------------------------|-----------|-----------|-----------|
|               |  | 0.5<br>hr                                   | 2<br>hrs | 12<br>hrs | 24<br>hrs <sup>1</sup> | 36<br>hrs | 48<br>hrs | 72<br>hrs |
| 40°F or above | 15 lbs                                     | 240   | 240      | 200       | 120                    | 160       | 120       | 80        |

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

1 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<br>(lb/1,000 ft <sup>3</sup> ) | Minimum Concentration Readings (ounces) At: |          |           |                        |           |           |
|---------------|--|---|----------|-----------|------------------------|-----------|-----------|
|               |  | 0.5<br>hrs                                  | 2<br>hrs | 12<br>hrs | 24 <sup>1</sup><br>hrs | 36<br>hrs | 48<br>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.

## 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

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

**TABLE 5-4-1: 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.**

| 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.