



Commodities should be exposed at 112 °F to determine tolerance to the treatment before commercial shipments are attempted.

T106-b-7

Tomato

Pest: *Ceratitis capitata* (Mediterranean fruit fly), *Bactrocera dorsalis* (Oriental fruit fly), and *Bactrocera cucurbitae* (melon fly)

Treatment: T106-b-7 Vapor heat

1. Raise temperature of article by saturated water vapor at 112 °F until approximate center of fruit reaches 112 °F within a time period designated by the PPQ officer.
2. Hold fruit temperature at 112 °F for 8.75 hours, then cool immediately.

Pretreatment conditioning is optional and is the responsibility of the shipper. Treatment is required for shipments from Hawaii.



Commodities should be exposed at 112 °F to determine tolerance to the treatment before commercial shipments are attempted.

T106-b-8

Zucchini

Pest: *Ceratitis capitata* (Mediterranean fruit fly), *Bactrocera dorsalis* (Oriental fruit fly), and *Bactrocera cucurbitae* (melon fly)

Treatment: T106-b-8 Vapor heat

1. Raise temperature of article by saturated water vapor at 112 °F until approximate center of fruit reaches 112 °F within a time period designated by the PPQ officer.
2. Hold fruit temperature at 112 °F for 8.75 hours, then cool immediately.

Pretreatment conditioning is optional and is the responsibility of the shipper. Treatment is required for shipments from Hawaii.



Commodities should be exposed at 112 °F to determine tolerance to the treatment before commercial shipments are attempted.

T107—Cold Treatment

Pulp of the Fruit

The pulp of the fruit must be at or below the indicated temperature at time of beginning treatment for all cold treatments.

Fruits for Which Cold Treatment Is Authorized

The following cold treatment schedules are authorized by Plant Protection and Quarantine (PPQ) for the control of specific pests associated with shipments of fruit. The cold treatment schedule that must be used for a specific commodity from a specific country is listed in the Fruits and Vegetables Section of the PPQ Nonpropagative Manual. These cold treatment schedules indicate the specific pests for which they are designed to control.

Treatment upon arrival may be accomplished at authorized ports as named in the permits.

Treatment in transit may be authorized for specifically equipped and approved vessels or containers and from approved countries, for entry at ports named in the permits. Intransit cold treatment authorization must be preceded by a visit to the country of origin by a PPQ official to explain loading, inspection, and certification procedures to designated certifying officials of country of origin. Refrigerated compartments on carrying vessels and cold storage warehouse must have prior certification by PPQ. Authorization of cold treatments from countries with direct sailing time less than the number of days prescribed for intransit refrigeration treatment must be contingent on importer understanding that prescribed intransit refrigeration period must be met before arrival of vessel at the approved U.S. port.

Gaps in the cold treatment data print-out for pulp sensors and air sensors shall be allowed or disallowed on a case-by-case basis, taking into account the number of gaps, the length of each gap, and the temperatures before and after. Air temperatures may occasionally exceed treatment temperatures during defrost cycles; however, fruit temperatures should not rise appreciably during this time. During non-defrost times, the temperatures of the air sensors should never exceed the maximum allowable treatment temperature.



Important

Some commodities may require fumigation in addition to a T107 cold treatment. Check the PPQ Nonpropagative Manual to determine the required treatments for a commodity from a specific country.



Cold treatment in *break-bulk* vessels must be initiated by an APHIS officer when shipments are from Italy, and Taiwan. However, cold treatment in *containers* may be initiated by treatment technicians from these countries only because they have been trained to initiate cold treatments for containers and not break-bulk vessels.

T107-a

Apple, Apricot, Avocado, Cape Gooseberry Cherry, Ethrog, Grape, Grapefruit, Kiwi, Loquat, Litchi (Lychee), Nectarine, Orange, Ortanique, Peach, Pear, Persimmon, Plum, Plumcot, Pomegranate, Pummelo, Quince, Sand Pear, Tangerine (includes Clementine)

Pest: *Ceratitis capitata* (Mediterranean fruit fly) and *Ceratitis rosa* (Natal fruit fly)

Treatment: T107-a Cold treatment

Temperature	Exposure Period
34 °F (1.11 °C) or below	14 days
35 °F (1.67 °C) or below	16 days
36 °F (2.22 °C) or below	18 days



Pretreatment conditioning for avocado (heat shock or 100.4 °F (38.0 °C) for 10 to 12 hours) is optional and is the responsibility of the shipper. The pretreatment conditioning, which may improve fruit quality, is described in HortScience 29 (10): 1166-1168. 1994. and 30(5): 1052-1053 (1995)

T107-a-1

Apple, Apricot, Cherry, Grape, Grapefruit, Kiwi, Nectarine, Orange, Peach, Pear, Plum, Pomegranate, Quince, Tangerine (includes Clementine)

Pest: *Ceratitis capitata* (Mediterranean fruit fly) and species of *Anastrepha* (other than *Anastrepha ludens*)

Treatment: T107-a Cold treatment

Temperature	Exposure Period
34 °F (1.11 °C) or below	15 days
35 °F (1.67 °C) or below	17 days

T107-b **Apple, Apricot, Cherry, Citron, Ethrog, Grapefruit, Litchi, Longan, Orange, Peach, Persimmon, Plum, Pomegranate, Tangerine (includes Clementine), White Zapote**

Pest: *Anastrepha ludens* (Mexican fruit fly)

Treatment: **T107-b** Cold treatment

Temperature	Exposure Period
33 °F (0.56 °C) or below	18 days
34 °F (1.11 °C) or below	20 days
35 °F (1.67 °C) or below	22 days

T107-c **Apple, Apricot, Carambola, Cherry, Grape, Grapefruit, Orange, Pomegranate, Tangerine (includes Clementine)**

Pest: Species of *Anastrepha* (other than *Anastrepha ludens*)

Treatment: **T107-c** Cold treatment

Temperature	Exposure Period
32 °F (0 °C) or below	11 days
33 °F (0.56 °C) or below	13 days
34 °F (1.11 °C) or below	15 days
35 °F (1.67°C) or below	17 days

T107-d **Apple, Grapefruit, Kiwi, Orange, Pear, Tangerine (includes Clementine)**

Pest: *Bactrocera tryoni* (Queensland fruit fly)

Treatment: **T107-d** Cold treatment

Temperature	Exposure Period
32 °F (0 °C) or below	13 days
33 °F (0.56 °C) or below	14 days
34 °F (1.11 °C) or below	18 days
35 °F (1.67°C) or below	20 days
36 °F (2.22 °C) or below	22 days

T107-e

Apricot, Citrus, Nectarine, Peach, Plum

Pest: *Cryptophlebia leucotreta* (false codling moth) and *Ceratitis rosa* (Natal fruit fly)

Treatment: **T107-e** Cold treatment

Temperature	Exposure Period
31 °F (-0.55°C) or below ¹	22 days

- The treatment shall not commence until all sensors are reading 31°F (-0.55°C) or below. If the temperature exceeds 31.5°F (-0.27°C), the treatment shall be extended one-third of a day for each day or part of a day the temperature is above 31.5°F (-0.27°C). If the exposure period is extended, the temperature during the extension period must be 34° F (1.11°C) or below. If the temperature exceeds 34°F (1.11°C) at any time, the treatment is nullified. Also, some freeze damage to the fruit may occur if the pulp temperature is allowed to drop below approximately 29.5°F (-1.38°C) (This varies with the commodity.)

T107-f

Carambola, Litchi (Lychee), Sand Pear, Ya pear

Pest: *Bactrocera cucurbitae* (Melon fly), *Bactrocera dorsalis* (Oriental fruit fly), and *Eutetranychus orientalis* (Oriental citrus mite)

Treatment: **T107-f** Cold treatment

Temperature	Exposure Period
32 °F (0 °C) or below	10 days
33 °F (0.56 °C) or below	11 days
34 °F (1.11 °C) or below	12 days
35 °F (1.67 °C) or below	14 days



Important

If the fruit is shipped from an area where Mediterranean fruit fly also occurs in combination with melon fly and/or Oriental fruit fly, use T107-a

T107-g

Pecans and Hickory nuts

Pest: *Curculio caryae* (Pecan weevil)

Treatment: **T107-g** Cold treatment

Temperature	Exposure Period
32 °F (0 °C) or below	7 days

T107-h Longans, Litchi (Lychee)

Pest: *Bactrocera dorsalis* (Oriental fruit fly), *Bactrocera curcubitae* (melon fly) and *Conopomorpha sinensis* (lychee fruit borer)

Treatment: **T107-h** Cold treatment

Temperature	Exposure Period
33.4°F (0.77 °C) or below	13 days
33.8 °F (0.99 °C) or below	15 days
34.5 °F (1.38 °C) or below	18 days

T107-j Longans

Pest: *Bactrocera dorsalis* (Oriental fruit fly) and *Bactrocera curcubitae* (melon fly)

Treatment: **T107-j** Cold treatment

Temperature	Exposure Period
33.8 °F (0.99 °C) or below	13 days
34.5 °F (1.38 °C) or below	18 days

T108—Fumigation Plus Refrigeration of Fruits

Fruits for Which Fumigation Followed by Cold Treatment Is Authorized

The following treatment schedules (fumigation followed by cold treatment) are authorized by Plant Protection and Quarantine (PPQ) for the control of specific pests associated with shipments of fruit. The treatment schedule that must be used for a specific commodity from a specific country is listed in the Fruits and Vegetables Section of the PPQ Nonpropagative Manual. These treatment schedules indicate the specific pests for which they are designed to control.



For Hawaiian-grown avocados, research has shown that, during the process of cold treatment (T108-a), a single transient heat spike of no greater than 39.6 °F (4.2 °C) and no longer than 2 hours, during or after 6 days of cold treatment, does not affect the efficacy of the treatment. However, in the absence of supporting research, such a tolerance for heat spikes shall not be extended to other fruits.