



**VINE MEALYBUG (VMB) HOT-WATER TREATMENT
PROTOCOL FOR DORMANT GRAPEVINE MATERIAL**

A. Hot-Water Treatment - Recommended to be done in three phases 1) Warm-up; 2) Treatment; 3) Cool-down.

1. Optional - Warm-up - 86 °F (30 °C)
2. Mandatory - Treatment - 123.8 to 127.4 °F (51 to 53 °C) for five minutes
3. Optional - Cool-down - 73.4 °F or less (22.9 °C)

The hot water dip treatment phase is mandatory and must be observed. Warm-up and cool-down phases are optional and may be performed at the grower's discretion.

B. Duration - The treatment phase is of a minimum five-minute duration at the specified temperature.

C. Water - Constant water circulation is required.

D. Supervision -

1. The county agricultural commissioner (CAC) shall approve the dipping equipment prior to the dipping.
2. The CAC shall ensure that the recording thermometer is calibrated prior to use.
3. Unless the treatments are performed under the terms of a compliance agreement, the CAC should visit the site on a daily basis during the dipping to examine the recording from the thermometer. If a nonrecording thermometer is used, the CAC shall supervise each lot treated.
4. For dipped plant material that does not meet the standards outlined in this procedure it is recommended not to re-dip due to cumulative damage to the vines.

E. Equipment -

Mandatory Equipment

1. A thermometer with multiple probes accurate to $\pm 1^\circ\text{F}$ (see F).
2. Tank to be used for the treatment phase.

Optional Equipment

3. Tank to be used for the warm-up phase.
4. Tank may be used for the cool-down, or running water such as a hose may be used for cooling vines.

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F. Calibration –

Each year, before plant material is dipped, the thermometer must be calibrated and approved by the CAC.

G. Procedures -

1. A minimum of three temperature probes must be placed; one probe near the heatsource and at least one probe within the bundle or cluster of plant material.
2. Plant material (tight bundles of 50 to 200 vines) to be dipped must be placed loosely in baskets or in bins.
3. The ratio of water to plant material must be such that after immersion of the vines, the water temperature recorded by the probe in the plant material returns to temperature within one minute.
4. Water in the dip tanks must constantly circulate during the treatments to ensure even distribution of temperature in the tank.
5. If warm-up phase is performed, it is recommended that plant material is first placed in the warm-up phase tank for five to seven minutes to reach the recommended temperature.
6. During the treatment phase, temperatures at all probe locations must be held between 123.8 and 127.4 °F for five minutes after an initial temperature drop and recovery. Any drop in temperature during the treatment phase below 123.8 °F must be corrected within one minute. It is recommended that the temperature not exceed 129 °F.
7. Immediately following the treatment phase, it is recommended that the plant material be plunged into cool water or hosed off to help prevent damage to the plants.