

Standardized Temperature Measurements for Packed Cut Flowers and Greens

By George Staby, Jim Thompson and Michael Reid

Goal – To accurately and consistently measure and record the temperatures of packed cut flowers and/or cut greens.

Background - Research was conducted at the University of California, Davis on August 25, 2005 by Jim Thompson, Michael Reid, and George Staby to determine which type of temperature probes work best to measure cut flowers and greens in shipping boxes. Several infrared thermometers, standard needle probe thermometers, and computer-connected thermocouples (as references) were tested.

Results - No infrared temperature probe tested worked well enough to be recommended. Only durable and thin needle-like temperature probes attached to battery-operated digital readouts are being recommended at this time.

Probe calibration – Follow the manufacturers' directions to calibrate temperature probes and check batteries at least once per month. If calibration directions are not provided, fill a large Styrofoam cup with crushed ice and then add cold water to the brim. Stir the ice water slurry for about one minute with the temperature probe. The temperature should read 32F (0C). If needed, adjust to 32F (0C) following the manufacturers' directions. Do not use the thermometer if it is out of calibration by more than 1 degree F and cannot be adjusted to read correctly.

Probing flowers and/or greens –

- 1) For big/dense flowers such as roses, carnations, chrysanthemums, and sunflowers, insert the probe directly into a flower head through a precooling vent hole in the box or from the top for flowers shipped in wet packs.
- 2) If the flower heads are too small to be probed directly or when shipping cut greens, insert the probe six inches into the flower/foilage mass, again through the precooling vent holes or from the top of wet packed shipments.
- 3) After about ten seconds, pull the probe out and immediately reinsert it in a different flower or area of flowers and foliage.
- 4) Wait until the temperature readout stabilizes, which is determined when it changes less than about 0.2 degrees F in five seconds.
- 5) Record the results.

Recording data – There is no point in taking temperature readings if they are not written down, shared with others, and/or acted upon to improve product outturn. Record temperatures in a logbook, enter them in a computer program like Microsoft Excel, or note them directly on transportation documents like waybills or the box itself.

Basis for these Recommendations

Infrared temperature probe limitations – 1) Only surface temperatures are recorded, which can result in false readings when warm flowers are being cooled, or cool flowers are exposed to warm air; 2) If the probe is not aimed properly, false readings are possible; 3) For sleeved flowers and/or foliage, one can be measuring sleeve temperatures, not flower or foliage temperatures; 4) The greater the difference between the temperature of the flowers or foliage and air temperature where the readings are being taken, the higher the probability of false readings; and 5) Differences between the temperature of the infrared device and the air temperature may also result in false readings.

Needle-type temperature probe limitations – 1) Probes that are too thick take longer to equilibrate and thus longer to measure temperatures accurately; and 2) The bigger the difference between the probe temperature and the flower/foilage temperature at the time of probing, the greater the time for temperature equilibration and the greater the possible temperature measurement error. This is why it is recommended that the probe be withdrawn and reinserted immediately.

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