

# DOMESTIC MARKET MATURITY TESTING

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## 1.0 General

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The AGA has implemented the early start programme for the domestic market to ensure that the quality of early season fruit entering the domestic market is of an acceptable standard. This programme will only operate until such time as adequate volumes of fruit that meets the normal maturity requirements are available. It is not designed as a de facto lowering of the maturity standard, nor is it intended to encourage supply of early season product. The focus of the programme is to ensure that the demand for early season fruit is met by product that will generate market and consumer confidence.

Implementation of the programme will be dependent on the results of the AIC regional maturity monitoring programme and will be regionally based.

### 1.1 Minimum maturity requirements

#### *Regional dry matter below 24% (Domestic Early Start)*

By default the Domestic early start programme will operate on a regional basis until such time as the regional average based on the monitor orchards reaches 24% dry matter content. The criteria for the Domestic Early Start Programme are:

- The average dry matter content across the 10 fruit sampled is at least **23%**.
- Clearance has been verified by an Independent Third Party.
- All fruit must be test ripened to ensure confidence in product.
- All fruit must be ethylene ripened using the AIC Ethylene Ripening Protocol.
- A copy of the verified maturity test must accompany the consignment.
- Any fruit that averages 24% or greater will not need to be ethylene ripened.

### ***Regional dry matter 24% or greater***

Once the regional average based on the monitor orchards reaches 24% dry matter content the minimum dry matter requirement for all orchards in that region increases to 24 % and the requirement for ethylene ripening no longer applies. The criteria then become:

- The average dry matter content across the 10 fruit sampled is at least **24%**.
- Clearance has been verified by an Independent Third Party.

### ***Blanket Dispensation for maturity testing***

At such time as the AIC grants an industry wide or regional dispensation for maturity testing for export fruit, the maturity testing requirement for the domestic market will also be lifted.

- No maturity testing required.

## **1.2 Independent verification**

All maturity tests must be collected and verified by an independent third party.

- The independent third party must be someone who does not have a vested interest in the outcome of the maturity test.
- The sample for maturity testing must be collected by an independent third party using the procedure outlined in Section 2.0. This need not be the same person performing the maturity test.
- Testing of the sample for dry matter content must be done according to the protocol in Section 3.0. Again, the testing procedure must be performed by a person who does not have a vested interest in the outcome.
- Those responsible for collecting and testing of the maturity sample must be named and sign the maturity test form. Some local marketers have indicated that they may insist on sighting these forms.

## **1.3 Records**

The Packer must retain test records (ie. Copies of Dry Matter Assessment Sheets) for inspection by local marketers. Proof of maturity may be asked for by appropriate marketing agencies, the AGA or the NZAPF Inc to verify questions from the market.

## 2.0 Maturity Sample Collection Procedure

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The sample should be representative in terms of tree age and fruit size of the blocks to be harvested. The maturity clearance will only apply to fruit of that particular maturity area included in the sample.

Moisture loss can significantly corrupt results of a dry matter test. It is essential fruit is tested promptly and not subjected to drying or hot conditions.

### 2.1 Maturity Clearance Area

Where there is considerable variation in tree age between blocks these should be sampled as separate maturity areas. The maturity clearance will only apply to fruit of that particular maturity area included in the sample.

A Maturity Clearance Area (MCA) is defined as an area that is to be cleared by a single maturity test. This area may consist of more than one block. Each MCA should be clearly identified by name and location. The MCA may be defined by tree age e.g. a separate 10 fruit maturity sample for each age band. If, however, a defined maturity area is to include different age trees then the sample should include, proportionately, fruit from all tree ages.

Normally young trees 2 to 3 years of age at set will be up to six weeks ahead of mature trees with 4 to 5 year old trees somewhere in between. It is important that this difference be incorporated into the sample selection to avoid bias.

A map should be available outlining the boundaries of the MCA's. These maps need to be provided to the person collecting the samples. These maps will also need to be used by the harvesting gangs so they know where to pick.

### 2.2 Fruit Collection

1. Clearly label bags for collecting fruit (using permanent marker) with growers PPIN and/or name. Bags should also be labeled with the date time of sampling and the name of the sampler.
2. Select one fruit from 10 - 15 trees ensuring fruit is free of sunburn and/or wounds. Fruit that is ridged or has minor blemishes is acceptable.

3. Walking diagonally across the MCA collect fruit from the North-East side of the trees, using a compass.
4. Select fruit at random between 1.5m and 4m above the ground. Take no more than one fruit per tree. In the case of mature trees where the majority of fruit is above 4m fruit can be selected up to 6m.
5. If the Maturity Clearance Area has trees of mixed ages the sample must be taken in proportion to the age classes represented e.g. If the MCA is made contains 75% of 8 year old trees and 25% of 3 year old trees the sample to be analysed must have 8 fruit from the 8 year old trees and 2 fruit from the 3 year old trees.
6. The size of the sampled fruit should be representative of those to be harvested. No individual fruit to weigh less than 162g.
7. Fruit must be snipped from the trees. Cut stalks short and square to prevent them puncturing plastic bags.
8. Fruit must be placed immediately into labelled plastic bags and sealed to ensure minimal water loss. Place damp paper towels in the plastic bag to maintain humidity ensuring there is no free water in the plastic bags.
9. If samples are not to be processed immediately place the sealed plastic bag with the samples into a chilly bin. Between picking and testing samples must be kept under conditions which will minimise water loss.
10. Samples must be processed within 12 hours of picking.
11. Sampling wet fruit  
Although sampling dry fruit is ideal it will at times be necessary to sample wet fruit. When this situation arises any wet fruit collected should be dried immediately with a paper towel and then treated as per normal sampling procedure. The fact that the fruit were wet when sampled should be noted, and recorded with the sample results.

### 3.0 Dry Matter Testing Method

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Dry matter testing is a relatively simple procedure once the process has been learned. It is essential the work be performed exactly as documented here. Should any part of the process be varied (eg. field sampling, peeling or delays in testing), then inaccurate or misleading results are likely.

Equipment required includes:

- A dehydrator.
- Scales (laboratory balance beam or electronic) capable of measuring to within one tenth of one gramme accurately.

See also 3.6 “Dry Matter Assessment Sheet.”

### 3.1 Preparation of Samples

At the testing station:

1. Lay out a 2x2 coffee filter paper for each of the test samples. (Alternately, thermoplastic or glass sampling dishes may be used).
2. With a marker pen write an identifier code on a corner of each of the filter papers and towels, eg. *H-1* for Hollywell sample 1 and *H-2*, *H-3* etc.
3. Weigh each fruit with scales and record weight on Assessment Sheet, in “Fruit weight” column.
4. Remove all moisture from filter papers by placing in:
  - Microwave for 20-30 seconds or
  - Dehydrator for 15 minutes.

NB. A Dehydrator is required for the drying of fruit samples, however a microwave is suitable for drying the filter papers.

5. Weigh the filter paper for each test sample.
  - For this, use scales capable of measuring to within one-tenth of one gramme accurately. NB. Kitchen scales are not accurate enough to achieve this.
  - Record the filter paper weight on the Assessment Sheet, “Container Weight” column. Write to nearest one-tenth gramme, eg. 2.4g.
6. Slice each avocado in half longitudinally, ie. A vertical cut from button to base.
7. From the test sample (half), remove the seed from the flesh, and:
  - Observe colour and texture of the seed coat.
  - Peel seed coat from the flesh carefully to avoid removing flesh.
  - Rate and record observations of seed coat on the Assessment Sheet, eg.

- **M** For a mature seed coat that is brown and paper thin
  - **Med.** Where the seed coat is still colouring and the membrane is drying
  - **Imm.** Where the seed coat is pale yellow and fleshy
8. Then for each sample in the test:
- either:** (peel method)
- Cut the test sample in half longitudinally and:
  - Peel away some skin from one quarter, taking care not to remove flesh, then
  - With a potato peeler, take a number of slices totaling 20-30 grammes (without skin) from top to bottom of the inside face of one quarter (from the test sample).
  - Weigh the “20 gramme” sample on filter paper base, with laboratory scales.
  - Record the weight on the Assessment Sheet in “Fresh+cont. weight” column, eg. 21.8g.
- or:** (core method)
- Plugs of tissue (20-30 grammes) may be taken from the centre of the fruit using a coring machine. The peel and seed should be cut away from the core and discarded.

### 3.2 Drying

1. Place each “20 gramme” sample and filter paper base in the dehydrator, allowing sufficient space in the tray for proper air circulation.
2. Set the thermostat at 55<sup>o</sup> Celsius.
3. Leave sample to dry for a minimum of 18 hours.

NB. For the 1<sup>st</sup> few times tests are done it is best to wait a minimum of 18 hours, weigh a sample (including the filter paper base) and then place the sample back in the dehydrator for another hour. Take the same sample out and re-weigh. If the weight is constant then it can be seen that the sample had been fully dried after the 1<sup>st</sup> drying period and further drying was unnecessary. With repetition of this check, the operator will be able to determine the minimum drying time required to remove all moisture.

4. When the samples are completely dry, they must be weighed immediately on removal from the dehydrator (as they will quickly pick up moisture from the air and this will corrupt the test).

5. Record all sample gross weights.

### 3.3 Calculating Results

1. Subtract the weight of the filter paper base (Container weight) from the weight of the dry sample (Dry + cont. weight). Enter this figure on the Assessment Sheet and write this figure in the column headed “Nett weight of dry.”
2. Divide the “Nett weight of dry” figure by the “Nett weight of fresh”, to derive the “% dry matter” of the sample. Enter this on the Data Sheet, in column “% dry matter.”
3. Calculate the “Average % dry matter” and “% variation” figures (optional).

### 3.4 Assessing Results

1. **Seed coat.** There is generally a strong correlation between the condition of the seed coat and fruit maturity. This is an excellent field test to aid in the timing of initial sampling (dry matter test). The darker, thinner and dryer the seed coat, the more likely the fruit will be mature.
2. **% Dry Matter** indicates the relative maturity of each fruit compared to others in the sample. The lowest maturity level and the spread are key issues.
3. Acceptable maturity. This is the average dry matter content across the 10 fruit is at least 24%.
4. **% Variation.** The Ripening Operator will find this figure useful as it indicates variability in ripening speed and colour that can be expected in a pre-ripened tray of fruit. Gas ripening at an optimum temperature tends to make the fruit turn red. A higher temperature would create better colour, however this would reduce shelf life and increase rot levels.

### 3.5 After the Test

1. The test results must be verified by an independent third party. This may be any person who does not have a vested interest in the outcome of the test result.
2. Arrange for a maturity sample to be collected by an independent third party according to the guidelines in Section 1.2

3. The sample must be promptly forwarded to the person performing the maturity test and they must follow the guidelines given here. This person must not have any vested interest in the outcome of the test result. They need not be the same person who collected the maturity sample.
  
4. Both the person collecting the sample and those performing the maturity test must sign the maturity assessment sheet. These assessment sheets must be retained on file and made available to the Local Marketer and/or Ripening Operator, as requested.

### 3.6 Dry Matter Assessment Sheet

## Independent Verification of Dry Matter

### Assessment Sheet

Grower:

Date:

Sample	Fruit weight	Seed coat	Container weight	Fresh + cont. weight	Nett weight of fresh	Dry + cont. weight	Nett weight of dry	% dry matter
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							

**Average dry matter content**

%

**% Variation**

%

Sample collected by:

\_\_\_\_\_ Name/ Organisation

\_\_\_\_\_ Signature

\_\_\_\_\_ Date

Sample tested by:

(if different from above)

\_\_\_\_\_ Name/ Organisation

\_\_\_\_\_ Signature

\_\_\_\_\_ Date