Australian Cherry Quality Guide

“Enhance Your Profitability”
Acknowledgement

We wish to thank all those who have made the production of the Australian Cherry Quality Guide possible. These specifically include Stuart Pickworth and Stephen Riseborough from AFFCO, Trevor Ranford of Cherry Growers Australia, Horticulture Australia Ltd, Professor Anita Nina Azarenko, CherryNet, photographer Trevor Phillips, Chris Moloney and Russell Hall of Goulburn Valley Printing Services. It also includes those who have provided input at a number of workshops.

Thank you to Lifespan who have sponsored both the poster and guide.

Andrew Dick
General Manager, AFFCO
Objective

Background
The Australian cherry industry has traditionally been very fragmented with many growers, packers, wholesalers and exporters. Quality attributes have not been clearly characterised to date and thus many different standards of quality, size, sweetness and presentation are commonly found. In today’s increasingly sophisticated global marketplace, buyers and consumers demand that cherries are packed to the highest standards.

The Australian Fresh Fruit Company (AFFCO) has undertaken research into identifying practical quality attributes that ‘raise the bar’ for the Australian industry. Through partnership with Cherry Growers of Australia (CGA) and Horticulture Australia (HAL), consultation has taken place to create a set of product standards that meet the demands of the marketplace, yet are practical for all growers and packing sheds.

Aim
The aim of the CGA and the AFFCO Australian Cherry Quality Guide is to greatly improve the quality of cherries available for domestic and export sale.

This booklet is divided into sections which explain how cherries should be examined for quality, the product standard and the defect guide.

There is an accompanying poster which displays large photographs of typical defects that detract from cherry quality.
How to Use this Guide

This Booklet

This booklet should be read and understood by leading staff involved with the handling, harvesting, sorting, selling, buying or inspection of cherries throughout the supply chain from growers through to wholesalers, exporters and retailers.

It explains how proper quality surveys should be conducted and the methods of fruit quality assessments which includes fruit sizing and colour determination. The booklet also contains examples of typical cherry defects and varying degrees of what is acceptable for these defects. The Cherry Standard (version 1, 2004) establishes the current industry quality standard.

Cherry Growers of Australia
Cherry Standard (version 1, 2004)

This standard should be referred to by all staff responsible for maintaining quality standards within the supply chain from growers through to wholesalers, exporters and retailers. Cherries should be inspected by staff to ensure that they meet this standard (or higher as per buyer specification). It should be noted that the use of this standard is voluntary and is offered as an ‘industry wide’ benchmark. Individual buyers may request a higher specification or an export customer may require different product attributes.

Australian Cherry Quality Guide Poster

The accompanying cherry defect poster displays large photos of typical cherry defects. These posters should be used in conjunction with this booklet as a visual means of simply identifying common defects. These posters will be very useful in packing sheds, warehouses, or for buyers of domestic or export cherries.

The poster is an excellent means for basic staff training as well as an ongoing fast reference while sorting or inspecting cherries. It should be displayed in an easy to see location by all staff who carry out these tasks as a reminder or reference.
01 ‘Ultimate Cherry’. These cherries are examples of the ‘Ultimate Cherry’, perfect in size, colour and shape. Ideal for local and export trade.

02 Major Rot. Not recommended for commercial sale.

03 Major Rot. Not recommended for commercial sale.

04 Major Rot. Not recommended for commercial sale.
Defect Guide

**Stem Cracks**

05 Major Stem Crack.  
Not recommended for commercial sale.

06 Major Stem Crack.  
Not recommended for commercial sale.

07 Minor Stem Crack.  
This is acceptable for commercial sale within customer specifications.

**Splits**

08 Major Wet Split.  
Not recommended for commercial sale.

09 Major Suture Split > 3 mm.  
Not recommended for commercial sale.

10 Minor Dry Split <3 mm.  
This is acceptable for commercial sale within customer specifications.
Defect Guide

**Nose Crack**

11. **Major Nose Crack.**
   Not recommended for commercial sale.

12. **Minor Nose Crack.**
   This is acceptable for commercial sale within customer specifications.

13. **Minor Nose Crack.**
   This is acceptable for commercial sale within customer specifications.

**Bird or Insect Damage**

14. **Major Insect Damage.**
   Not recommended for commercial sale.

15. **Major Insect/Rot Damage.**
   Not recommended for commercial sale.

16. **Major Insect Damage.**
   Not recommended for commercial sale.
17 Major Thrip Damage.
Not recommended for commercial sale.

18 Minor Thrip Damage.
This is acceptable for commercial sale within customer specifications.

19 Minor Thrip Damage.
This is acceptable for commercial sale within customer specifications.

20 Major Scarring.
Not recommended for commercial sale.

21 Minor Scarring <3 mm.
This is acceptable for commercial sale within customer specifications.

22 Minor Scarring <3 mm.
This is acceptable for commercial sale within customer specifications.
Defect Guide

Pitting - Impact Damage

23 Major Pitting.
Not recommended for commercial sale.

24 Major Pitting.
Not recommended for commercial sale.

25 Major Pitting.
Not recommended for commercial sale.

Bruising with Skin Damage

26 Major Bruising.
Not recommended for commercial sale.

27 Minor Bruising.
This is acceptable for commercial sale within customer specifications.
28 Spur.
This is acceptable for commercial sale within customer specifications.

29 Double.
This is acceptable for commercial sale within customer specifications.

30 Overmature and Heat Damage.
Not recommended for commercial sale.

31 Immature.
Not recommended for commercial sale.

Colour Relates to Bing cultivar
How to Conduct Cherry Quality Surveys

Cherry samples should be taken randomly from various boxes or packs or from the end of the packing line. The most common way of conducting the surveys is to have defect containers set out and cherries placed in them as the sample is counted.

Step 1. A random sample of at least 50 to 100 cherries are taken.

Step 2. Cherries are counted as they are sorted for defects and placed in the various defect containers as per the defect guide.

Step 3. After the cherry sample is sorted, totals of each defect are counted to give percentages of each defect. For a 50 cherry sample, the number is doubled to give the percentage.

Eg. 3 wet splits in a 50 cherry sample
= 6% wet splits.

At this time, cherries should also be examined for undersize and immaturity. See “How to Use a Cherry Colour Chart” (pg 12) and “How to use a Cherry Size Gauge” (pg 14). Undersize and immature fruit should also be separated and placed in appropriate defect containers.

Step 4. The totals of each defect are recorded on a Quality Survey sheet noting the sample time and date, batch, the sample size (ie. 50 cherries) and the percentage defects in the sample.

Step 5. Sugar content of the cherries should be taken from the random sample. Five cherries will give a good average of sugar content. The method used is to combine all cherries and get an average soluble solids content, using a handheld refractometer.

Step 6. The Quality Survey sheet should be compared to the Cherry Growers of Australia Cherry Standard or the customer specification to see if they meet the quality criteria set out. The survey sheet should be marked as to whether the sample meets the Cherry Growers of Australia Cherry Standard or the customer specification.

Note: Staff need to make honest and subjective appraisals of product quality without prejudice.
The Australian Cherry Colour Chart has been developed as a tool to help within the supply chain from growers through to wholesalers, exporters and retailers in determining ideal cherry maturity.

Different varieties should be harvested at different shades of colour as a guide of maturity. For example, Rons Seedling should be dark in colour around #5, whereas Burlat should be a lighter shade around #3.

In different climatic regions and micro-climates, some varieties will be at their optimum maturity and eating quality at different shades of colour. As a generalisation, warmer areas will require a lighter colour for optimal maturity than in cooler regions. Therefore colour should only be used as a guide and these differences in growing region should be considered.

Stem retention on cherries can be assessed by quantifying the pull force required to remove the stem from the cherry. Pull force gauges with suitable attachments are commercially available. Force is measured in grams and a value above 600 g is a benchmark for which an orchardist should strive. The stem pull force is largely variety dependent (eg. ‘Van’= 350-450 g; ‘Sweetheart’= 600-800 g) but horticultural practices can greatly impact this characteristic. Varieties with stem pull forces less than 500 g tend to lose stems during harvest and post-harvest handling. To use the gauge, simply cradle the cherry horizontally in the attachment and pull the stem horizontally with a uniform, steady force. A random sample of 25 fruit is recommended.
How to Measure Cherry Firmness

A number of devices are available to measure fruit firmness in cherries including penetrometers and non-destructive force deformation or impact sensors. Recently, FirmTech machines have gained in popularity for use in packing sheds. This machine is highly accurate and has a high speed of operation. Firmness of the cherry is assessed by measuring the force-deformation response from gradual compression of a cherry. The rotating table that holds the sample can accommodate 25 fruit. In addition to measuring firmness, the FirmTech will also measure fruit size (mm) of each cherry.
How to Use a Cherry Size Gauge

The internationally accepted method of determining cherry size is with a cherry size gauge as shown below. Cherries should be measured using a standard cherry sizing card with round holes measured in millimeters (mm).

Cherries should be measured for size by placing the cherries stalk-up into the holes. The size of the cherry is determined to be the stated size, or larger when it does not fall through the size hole.

Cherries should be labeled as the size that they are and larger with only a 10% tolerance on undersize fruit.

Example. 24 mm+ means 24 mm cherries and larger only.
Minimum Requirements:
The cherries must be:
- intact,
- fresh in appearance,
- sound; produce affected by rotting or deterioration such as to make it unfit for consumption is excluded,
- firm,
- clean, practically free of any visible foreign matter,
- free from pests,
- practically free from damage caused by pests,
- free from abnormal external moisture,
- free of any foreign smell and/or taste,

Sugar Levels: Minimum of 15° Brix

Sizing: Minimum size requirement of greater than 20 mm.
The following size grades should apply and be marked on each package:
- 20 mm+ (20 mm and Larger)
- 22 mm+
- 24 mm+
- 26 mm+
- 28 mm+
- 30 mm+
- 32 mm+
- etc……
(Explanation of size grades, eg. 24 mm+ would mean, 24 mm minimum fruit size).

Sizing Tolerance:
Fruit within each grade should be predominantly larger than stated grade with not greater than 10% undersize fruit. The minimum size within each grade should not be less than 3 mm below the stated size.
- Cherries should be measured using a standard cherry sizing card with round holes measured in millimeters (mm).
- Cherries should be measured for size by placing the cherries stalk-up into the holes.

The size of the cherry is determined to be the stated size or larger only when it does not fall through the stated size hole.

Appearance and Uniformity:
The contents of each package must be uniform and consist exclusively of cherries of the same origin, variety and quality. The fruit should be bright in appearance and of a relatively uniform appearance. Ideally stems should be attached, green and fresh in appearance.

Defect Tolerances
- Dehydrated stalks
- Russetting/scarring
- Non-discoloured pitting
TOTAL Superficial defect tolerance: 25%

Minor Defects
Minor defects are those which do not affect the shelf life of the product. Only 10% of the cherries may be affected with minor defects.
These include:
- Limb rub
- Skin blemish – sunburn & scuffing
- Healed cuts and punctures
- Misshaped
- Indentation and pressure flattening.
- Minor dry splits under 3 mm in length can be counted as a minor defect. An example of such is those on blossom end typical with some varieties or stem ring splits of a minor nature.
TOTAL Minor defect tolerance: 10%

Major Defects
- Rots, mould and decay 0.5% at packinghouse, 2% at destination.
- Soft, bladdery bruising 5%
- Over mature, bladdery fruit 5%
- Open wet cuts and cracks 2% at packing shed, 5% at destination.
- Open unhealed dry splits, cracks and punctures 5%
TOTAL Major defect tolerance: 5%
**AFFCO Best Guide Practice for Cherries**

Objective: Provide a minimum benchmark quality standard to be used as a reference by all sectors of the supply chain to improve the quality of cherries to consumer.

<table>
<thead>
<tr>
<th>CRITICAL FUNCTIONS &amp; SPECIFICATIONS</th>
<th>BEST PRACTICE</th>
<th>MINIMUM FOR DOMESTIC CONSUMPTION</th>
<th>MINIMUM FOR OVERSEAS CONSUMPTION</th>
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<tbody>
<tr>
<td><strong>GROWING</strong></td>
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<tr>
<td>Spraying</td>
<td>Ensure spray program meets Maximum Residue Limits and minimizes chemical use.</td>
<td>Ensure Maximum Residue Limits are met</td>
<td>Ensure Maximum Residue Limits are met</td>
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<tr>
<td>Tree pruning</td>
<td>Regular pruning ensuring maximum fruit size and quality</td>
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<tr>
<td>Inputs</td>
<td>Maintain appropriate nutritional and irrigation programs to maximize fruit size and quality.</td>
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<tr>
<td>Quality procedures</td>
<td>Implement and hold accreditation of acceptable HACCP based system</td>
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<td><strong>HARVEST</strong></td>
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<tr>
<td>Staff training</td>
<td>Ensure all harvest staff are trained about food hygiene and best harvest practice.</td>
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<tr>
<td>Fruit maturity</td>
<td>Test that fruit is of minimum maturity level. Colour should be determined by variety. eg. Bing = # 4. Minimum soluble solids level (15°)</td>
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<tr>
<td>Hygiene</td>
<td>Ensure orchard and all harvest equipment is clean. Ensure staff are trained about food hygiene.</td>
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<tr>
<td>Traceability</td>
<td>Full traceability to orchard block, with date and variety on bins or containers.</td>
<td>Have full traceability to grower</td>
<td>Have full traceability to grower</td>
</tr>
<tr>
<td>Temperature management</td>
<td>Harvest fruit in early morning and halt harvest when temperature reaches 30°C.</td>
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<tr>
<td>Harvesting equipment</td>
<td>All buckets, totes or boxes should be covered or stored in shade prior to being removed from orchard.</td>
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<tr>
<td>HARVEST Continued</td>
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<tr>
<td>Transport from orchard to hydro cooler</td>
<td>Ensure fruit is transported in a gentle manner and not exposed to the sun through use of bin covers.</td>
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<tr>
<td>Cooling</td>
<td>Ensure fruit is hydro cooled to below 5ºC within 2 hours of being picked from tree.</td>
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<tr>
<td>Transport from hydro cooler to packing shed (if applicable)</td>
<td>Ensure that cool chain is maintained.</td>
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<tr>
<td>Storage prior to packing (if applicable)</td>
<td>Fruit is stored with a fruit core temperature of between 0ºC to 2ºC.</td>
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<tr>
<td>PACKING</td>
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<tr>
<td>QC controls</td>
<td>Ensure fruit traceability and QC controls are in place.</td>
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<tr>
<td>Critical measures:</td>
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<tr>
<td>Firmness</td>
<td>Fruit is inspected upon receival to packing shed to pre-determine quality attributes and potential market suitability.</td>
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<tr>
<td>Defects</td>
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<tr>
<td>Temperature</td>
<td>Maintain fruit temperature below 4ºC while being packed.</td>
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<tr>
<td>Appearance</td>
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<tr>
<td>Total Soluble Solids (TSS)</td>
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<tr>
<td>Temperature management</td>
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<tr>
<td>Packing shed hygiene</td>
<td>Ensure grading equipment, packing shed, are maintained to appropriate food safety standards. Water and equipment are properly and regularly sanitized. Water should be potable.</td>
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<tr>
<td>Pre-packaging hydro cooling</td>
<td>Fruit is hydro cooled before being packed in boxes between 0ºC and 5ºC.</td>
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<tr>
<td>Packaging</td>
<td>Cherries should be packed into a poly-liner or MAP bag with soaker pad. Packaging should allow for vent draft cooling.</td>
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<tr>
<td>Handling</td>
<td>Fruit is handled gently. Grading equipment is gentle to fruit.</td>
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<tr>
<td>PACKING Continued</td>
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<tr>
<td>Post packing cooling</td>
<td>Cherries should be cooled or force draft cooled down to as close to 0°C.</td>
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<tr>
<td>Critical measures:</td>
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<tr>
<td><strong>STORAGE/DISTRIBUTION</strong></td>
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<tr>
<td>Temperature management</td>
<td>Post packing core temperature &lt; 2°C while in storage.</td>
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<tr>
<td><strong>TRANSPORT</strong></td>
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<tr>
<td>Temperature management</td>
<td>Core temperature of 0°C to 4°C should be maintained. Temperature aim is as close to 0°C as possible.</td>
<td>Maximum fruit temperature 8°C; aim for 4°C</td>
<td>Maximum fruit arrival temperature 4°C</td>
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<tr>
<td><strong>AIR-FREIGHT</strong></td>
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<tr>
<td>Temperature management</td>
<td>MRL's, phytosanitary, protocol, export documents</td>
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<tr>
<td>at Freight Forwarder</td>
<td>Fruit should be draft cooled if above 5°C. Fruit should be loaded into ULD with a core temperature of between 0°C and 5°C.</td>
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<tr>
<td>Loading of ULD</td>
<td>Cherries should be loaded in ULD with sufficient Dry Ice and with container lined with Bubble Foil insulation.</td>
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<tr>
<td>Fruit Firmness</td>
<td>Minimum pressure of 250g/mm²</td>
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<tr>
<td><strong>SEA-FREIGHT</strong></td>
<td>(In addition to above)</td>
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<tr>
<td>Temperature management</td>
<td>Fruit is only loaded when core temperature is 0°C to 2°C.</td>
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<tr>
<td>Temperature recording</td>
<td>Always use data loggers Always record vent &amp; temperature settings</td>
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<tr>
<td>Fruit Firmness</td>
<td>Minimum pressure of 280g/mm²</td>
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<td>CUSTOMER HANDLING</td>
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<tr>
<td>Temperature Management</td>
<td>Fruit temperature management should be maintained upon customer receival. If fruit is packed in MAP, bags should be opened when cool chain is broken.</td>
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<tr>
<td>Product Handling</td>
<td>Fruit should be handled with care. Stock Rotation.</td>
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<tr>
<td>Displaying Cherries</td>
<td>Stock should be regularly rotated.</td>
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</tbody>
</table>

**Notes**
Amcor “LifeSpan” is proud to be associated with this produce quality improvement initiative.

At LifeSpan our goal has always been to provide genuine benefits to growers and exporters of fresh produce through the development of quality Modified Atmosphere Packaging solutions.

We recognise our MAP is only one link in the supply and distribution chain and therefore support and encourage the production of the only fruit quality, handling and packaging guide specifically for the Australian cherry industry.

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