

New Tree Quality

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*Images and text from Dr. Ed Gilman's
presentation on tree grades and
standards 9/12/2003*

You have finally decided to plant a tree or trees into your landscape, or you have been asked to spearhead a community tree planting event. You have done your research as to the best tree(s) to plant in the location you have chosen; right tree, right place. You head out to the nursery armed with the idea of the specific tree(s) you want, and the nursery does have one and it looks like the example above. Now what? A tree is a tree after all, right? But is it?

Do you say thanks but no thanks and keep looking or offer to take this poor thing home for free and invest 2-3 seasons to try and help it overcome an overwhelming number of issues. And then it dies. Now you have lost 2-3 growing seasons where a higher quality tree would have been adding to your property values or a strong community effort.

Where do you go to find a trusted authority on selecting a quality tree? If you are just interested in a single tree for your home, we can give you some guidance further in this article. If you are heading up a larger scale planting effort, then I would suggest starting with a couple of National standards you may wish to look at before getting started. The first is the American National Standards Institute (ANSI) Z60.1 2014

[ANSI Nursery Stock Standards AmericanHort 2014.pdf](#). This standard does not specifically address tree or shrub quality but in fact it is the standard used in production of trees and shrubs:

The purpose of the American Standard for Nursery Stock (ANSI Z60.1, the "Standard") is to provide buyers and sellers of nursery stock with a common terminology, a "single language," in order to facilitate commercial transactions involving nursery stock. For instance, the Standard establishes common techniques for (a) measuring plants, (b) specifying and stating the size of plants, (c) determining the proper relationship between height and caliper, or height and width, and (d) determining whether a root ball or container is large enough for a particular size plant.

The next ANSI standard to look at would be the suite of standards (soon to be combined into a single set) ANSI A300 standards for tree care operations (these standards must be purchased). More specifically, ANSI A300 (Part 6) - 2012 Transplanting (includes Planting). Specifically, the Appendix D *Sample procurement specification for quality nursery trees*.

The following pages are Appendix D:

Annex D – Sample procurement specification for quality nursery trees
(This annex is not part of the ANSI A300 Part 6 standard.)

This annex is based on published works by, and with permission from, Gordon Mann, Jay Banks, and Len Phillips

D-1 Forward: The following document is a sample specification that purchasers of trees can use to purchase a high-quality product. This specification may be copied and pasted into your bid documents or quote sheets, and edited to match your agency needs and format. It is imperative that you adapt this sample to meet the objectives of your procurement needs. For those purchasers using preferred nurseries, send them a copy of this specification and put them on notice that in “X” number of years (one to three?) your agency or organization plans to use this specification to purchase trees. Nurseries will need to be in compliance with these specifications.

Key traits of nursery trees are identified and described to provide growers and buyers with the information they need to distinguish acceptable quality stock from unacceptable quality stock. Structural and health characteristics are described, as well as labeling, compliance with laws and regulations, and inspection of nursery stock. If a particular defect or substandard element can be corrected easily, appropriate remedies may be performed prior to accepting delivery. Unacceptable trees will contain defects and substandard elements that cannot be easily corrected.

This draft specification is based on the *Calfire Nursery Specs and Tree Production Strategies* for guiding nurseries to grow high-quality plant material.

D-2 Sample procurement specifications for quality nursery trees

These specifications describe the difference between acceptable and unacceptable nursery stock.

D-2.1 Glossary

D-2.1.1 central leader: Also referred to as leader or the dominant leader. A dominant, typically upright stem – usually the main trunk. There can be several leaders in one tree, however the central leader, if present, is a continuation of the main trunk located more or less in the center of the crown, beginning at the lowest main scaffold branch and extending to the top of the tree.

D-2.1.2 clear trunk: The portion of the trunk below the main crown which may include shortened temporary branches.

D-2.1.3 codominant branches/codominant leaders: Branches or stems arising from a common junction, having nearly the same size diameter. (Often they are more vigorous, upright branches that originate from a common point, usually where the leader was lost or removed. Codominant stems are unacceptable in most installations.)

D-2.1.4 cultivar: A named plant selection from which identical or nearly identical plants can be produced, usually by vegetative propagation or cloning.

D-2.1.5 included bark: Bark embedded in the union between a branch and the trunk or between two or more stems that prevents the formation of a normal branch bark ridge. Included bark is unacceptable.

D-2.1.6 kinked root: A main root that is sharply bent. Kinked roots are unacceptable.

D-2.1.7 scaffold branch: A primary branch that forms part of the main structure of the crown.

D-2.1.8 taper: The thickening of a trunk or branch toward its base.

D-2.1.9 temporary branch: A small branch that is temporarily retained along the lower trunk of young trees.

D-2.1.10 trunk: The main woody part of a tree, beginning at and including the trunk flare and extending up into the crown from which scaffold branches grow.

D-2.2 Sample specifications – general

D-2.2.1 Proper Identification: All trees must be true to name as ordered or shown on planting plans and must be labeled individually or in groups by species and cultivar (as appropriate).

D-2.2.2 Compliance:

All trees must comply with federal and state laws and regulations requiring inspection for plant diseases, pests, and weeds. Inspection certificates required by law must accompany each shipment of plants. Clearance from the local county agricultural commissioner, if required, must be obtained before planting trees originating outside the county in which they are to be planted. Even though trees may conform to county, state, and federal laws, the buyer may impose additional requirements that pertain to local issues.

D-2.2.3 Trees are to be grown (when applicable) and graded according to ANSI Z60 *Nursery Stock* standards.

D-2.3 Sample tree specifications

These specifications apply to deciduous, broadleaf evergreen, and coniferous species. They do not apply to palms. Note that leaf characteristics will not be evident on deciduous trees during the dormant season.

D-2.3.1 Crown:

The form and density of the crown must be typical for a young specimen of the species/cultivar. Changes in form caused by wind, pruning practices, pests, or other factors must not substantially alter the form for the species/cultivar. These crown specifications do not apply to plants that have been specifically trained in the nursery to be: topiary, espalier, multi-stem, or clump; or unique selections such as contorted or weeping cultivars.

D-2.3.1.1 Trees must have a single, relatively straight trunk, and central leader. They must be free of codominant stems and vigorous, upright branches that compete with the central leader. If the original leader has been headed, a new leader at least one-half of the diameter of the original leader must be present.

D-2.3.1.2 Main branches must be well-distributed along the central leader, not clustered together. They must form a balanced crown appropriate for the age of the species/cultivar.

D-2.3.1.3 Branch diameter must be no larger than two-thirds (one-half is preferred) the diameter of the central leader measured 1 inch (2.5 cm) above where the branch is attached.

D-2.3.1.4 The attachment of the largest scaffold branches must be free of included bark.

D-2.3.1.5 Temporary branches, unless otherwise specified, may be present along the lower trunk below the lowest scaffold branch, particularly for trees less than 1 inch (2.5 cm) in caliper. These branches may be no greater than 3/8 inch (1 cm) diameter. Clear trunk must be no more than 30 percent of the total height of the tree.

D-2.3.2 Trunk:

The tree trunk must be relatively straight, vertical, and free of wounds, except properly made pruning cuts, which must be closed over or less than 3/4 inch (2 cm) diameter open, sunburned areas, conks (fungal fruiting bodies), wood cracks, bleeding areas, signs of boring insects, galls, cankers, stem-girdling ties, or lesions (mechanical injury).

D-2.3.2.1 Trunk caliper and taper must be sufficient so that the tree will remain vertical without a stake. Trunk caliper at 6 inches (15 centimeters) above the soil media (substrate) surface must be within the diameter range shown for each container size below and as specified in current edition of ANSI Z60 *Nursery Stock*.

For example:

Container Size	Trunk Diameter	
# 5.....	0.5" to 0.75"	(1.2 to 2 cm)
# 15.....	0.75" to 1.5"	(2 to 4 cm)
24-inch box.....	1.5" to 2.5"	(4 to 6.5 cm)

D-2.3.2.2 The cut made when re-growing the top may be just above the major structural roots. The "shank" that results from this procedure may be at a consistent height above the structural roots and no longer than 5 inches (12 cm), to ensure that the trees are consistently planted at the correct depth. The base of the trunk may not have a large pruning cut from re-growing the top.

D-2.3.3 Roots:

The root system must be substantially free of injury from biotic (e. g., insects and pathogens) and abiotic (e. g., herbicide toxicity and salt injury) agents.

D-2.3.3.1 The uppermost roots or root collar must be within the upper 2 inches (5 cm) of the soil media (substrate). Depth of the root-ball must be measured from the top of the ball, which in all cases must begin at the trunk flare. Soil above the trunk flare must not be included in the root-ball depth measurement, and must be removed.

D-2.3.3.2 The root collar and the inside portion of the root-ball must be free of defects, including circling, kinked, and stem-girdling roots. Soil removal or root washing near the root collar may be necessary to inspect for root defects.

D-2.3.3.3 Roots on the periphery and bottom of the root-ball must be less than 1/4 inch (.65 cm) in diameter while 1/8 inch (.3 cm) is preferred.

D-2.3.3.4 The tree must be well rooted in the soil media (substrate). Root distribution must be uniform throughout the soil or media. Structure and growth must be appropriate for the species/cultivar. When the burlap or container is removed, the root-ball must remain intact. When the trunk is lifted both the trunk and root system must move as one.

D-2.3.3.5 Trees may have several lateral roots or many fibrous roots spaced evenly around the trunk to provide support so the trees are stable when planted. A large percentage of small roots is preferred. These roots are key to the uptake of sufficient water and nutrients. Fibrous roots can be achieved by root-pruning, using air-pruning containers, or under-cutting or root pruning

and transplanting at any stage of production.

D-2.3.3.6 As a general rule for young nursery-grown trees, two or more structural roots are located within 1-3 inches (2.5-7.5 cm) of the soil surface. "First order lateral roots" is another term that has been used for these roots. If the roots are deeper than 3 inches (7.5 cm), the stock must be rejected if the rootball is undersized as specified in current edition of ANSI Z60.

D-2.3.3.7 Field-grown trees for balled and burlap delivery must have the roots pruned at least 6 inches (15 cm) inside the final rootball size performed within adequate time for the tree to develop fibrous roots at the outer edge of the root-ball prior to harvest and delivery.

D-2.3.4 Leaves:

The size, color, and appearance of leaves must be typical for the time of year and stage of growth of the species or cultivar. Trees must not show signs of prolonged moisture stress as indicated by wilted, shriveled, or dead leaves.

D-2.3.5 Branches:

Shoot growth (length and diameter) throughout the crown must be appropriate for the age and size of the species/cultivar. Trees must not have dead, diseased, broken, distorted, or otherwise injured branches.

D-2.4 Inspection

The buyer reserves the right to reject trees that do not meet these specifications. If a particular defect or substandard element or characteristic can be easily corrected, appropriate remedies must be performed by the nursery to move the plants into compliance. If destructive inspection of a rootball or balls is to be done, the buyer and seller must have an agreement as to the time and place of inspection, number or percent of trees or species/cultivars to be inspected, care of acceptable trees following inspection, and financial responsibility for the acceptable inspected trees.

At the time of inspection and delivery, the rootball must be moist throughout. If in leaf, the crown must show no signs of moisture stress or branch dieback. The roots must show no signs of excess soil moisture as indicated by poor root growth, root discoloration, distortion, death, or foul odor.

D-2.5 Delivery

The buyer must stipulate the date of requested delivery. The nursery must stipulate how many days prior to delivery that notification must be received, and any special considerations for care between requested delivery date and installation.

D-2.6 Delivery Inspection:

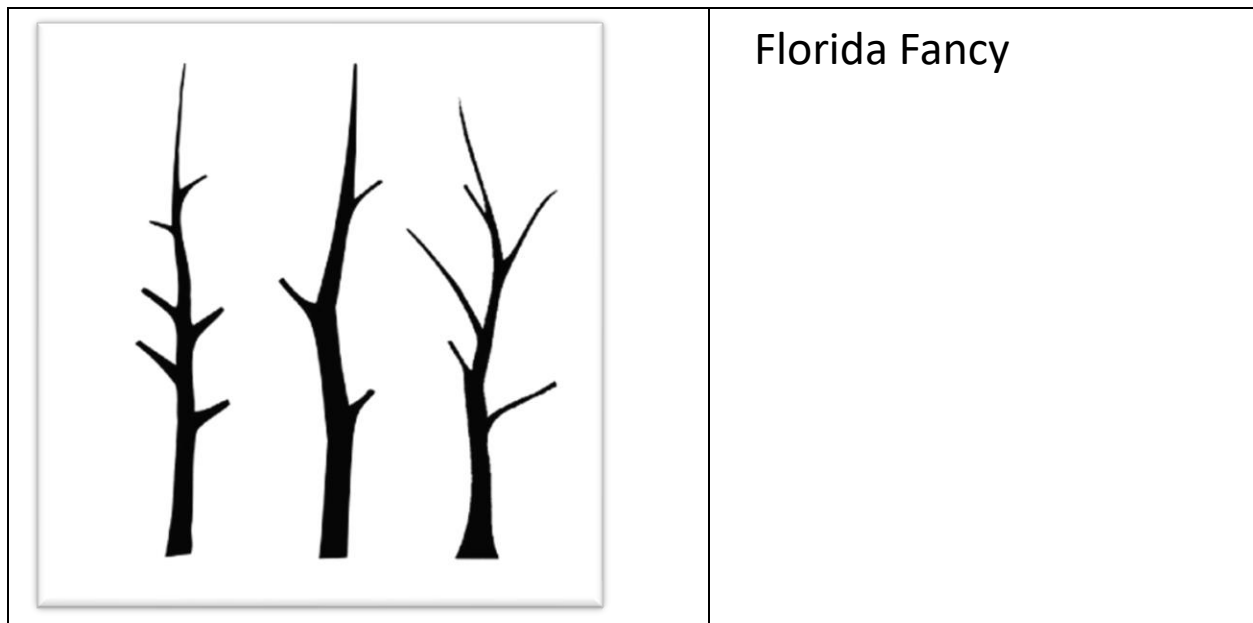
If the trees have not been inspected at the nursery prior to delivery, a representative number of trees may have the rootballs washed free of soil to inspect the root system care when the trees were moved from smaller containers to larger containers in the nursery. The soil must be washed completely off the rootball. The roots must be maintained moist and inspected for correct root pruning and root development from the seed, graft, or liner stages per C-2 above. If acceptable, the tree may be planted as a bare-root tree. If unacceptable, more trees may be inspected, or the delivery may be rejected.

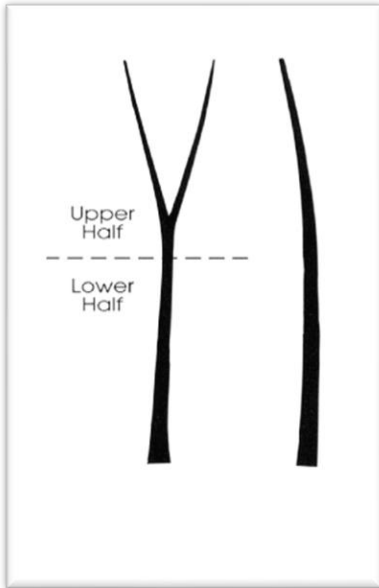
All these standards will only get you sort of close to understanding that quality needs to be considered, but they won't give you the details you may need to zero in on quality specimens. The last one of these general type of documents to consider is geared more toward a homeowner planting a couple of trees would be *Trees Are Good – Buying High Quality Trees*, through the International Society of Arboriculture's consumer portal at <http://www.isa-arbor.com/publicOutreach/treesAreGood/index>.

To truly get a closer understanding what entails a quality tree we must go out of state. Unfortunately, the Commonwealth of Virginia's nursery industry does not have a set of standards for tree quality. If we wanted to get a sense of what a quality standard for trees may look like you could check out Florida's set of standards at [Florida Grades and Standards for Nursery Plants 2022 \(fdacs.gov\)](http://fdacs.gov)

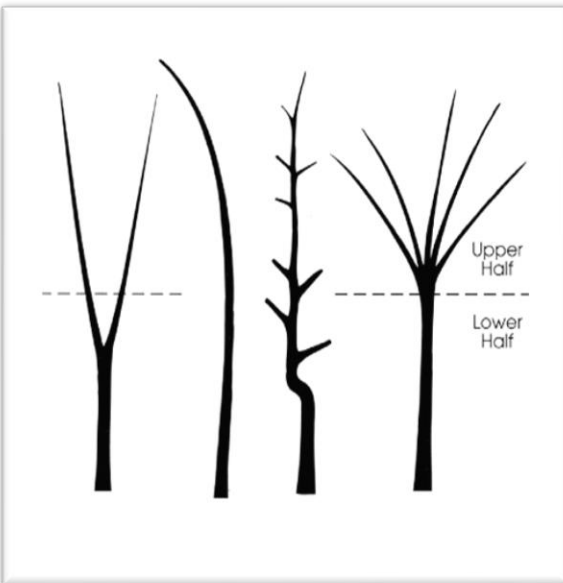
This is a large document for most trees and shrubs in the nursery trade in Florida. Florida grades their tree stock to four levels, Florida Fancy, Florida #1, Florida #2, and Cull. Some of the information gleaned from their standard is offered in this article. The main areas to consider for quality are grading the trunk, grade the branch attachment, using their tree matrix, trunk caliper, structural uniformity of the crown, down grading factors, and roots. Let me share some examples from their standard.

Grading the trunk:

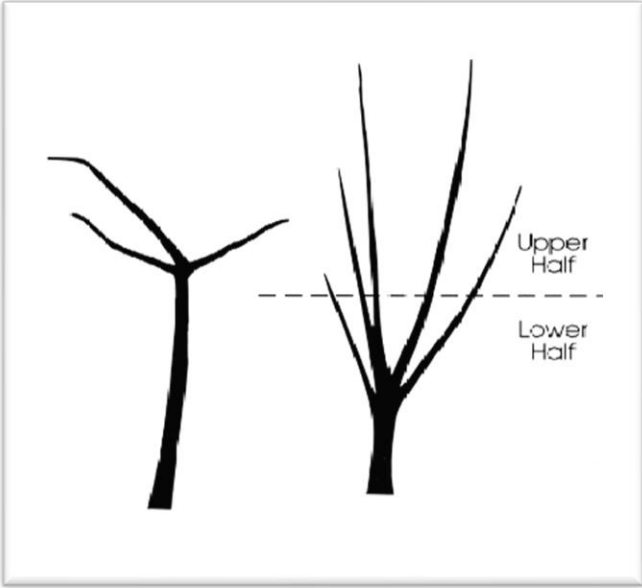





Florida #1



Florida #2

	<p>Cull</p>
<p>Images and text from Dr. Ed Gilman's presentation on tree grades and standards 9/12/2003</p>	

Grade the Branch Attachment

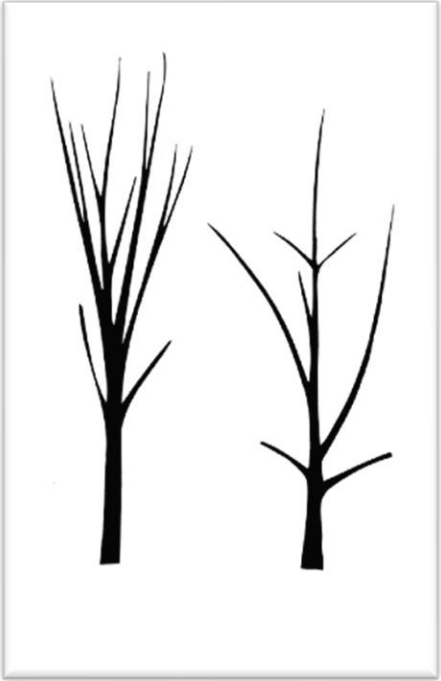
	<p>Florida Fancy</p>
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Florida #1

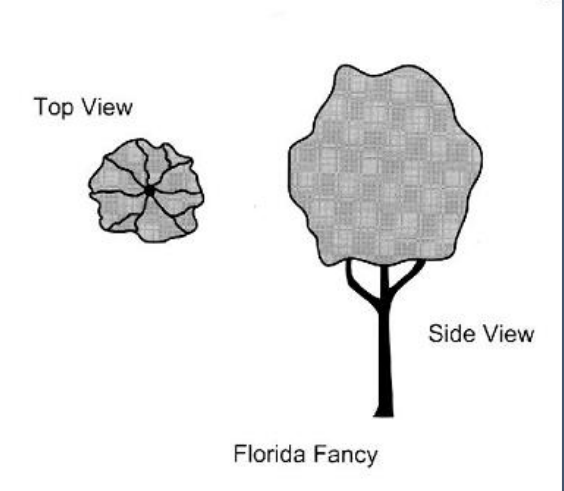


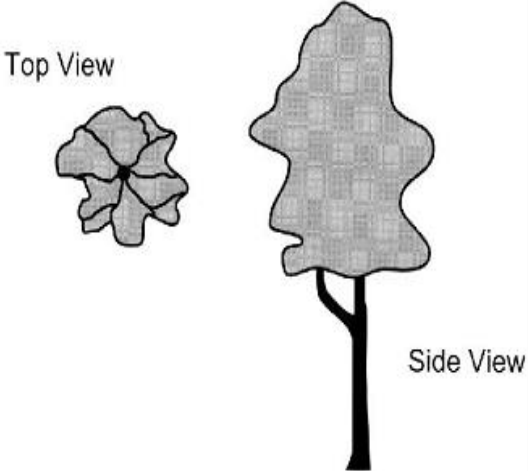
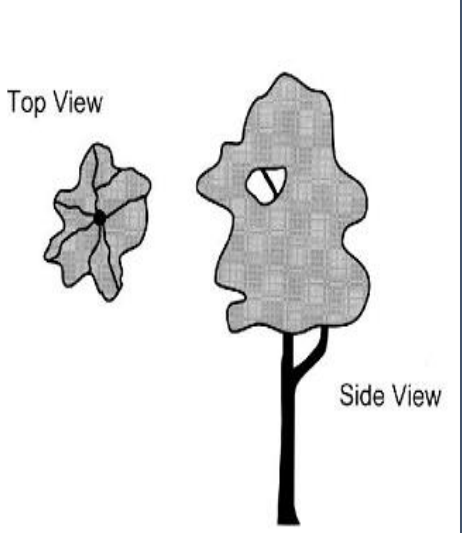
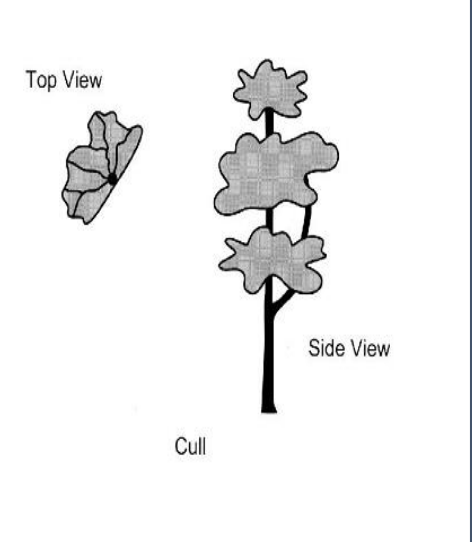
Florida #2

	<h2>Cull</h2>
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Images and text from Dr. Ed Gilman's presentation on tree grades and standards 9/12/2003

Structural Uniformity of the Crown

	<h2>Florida Fancy</h2>
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 <p>Top View</p> <p>Side View</p>	<p>Florida #1</p>
 <p>Top View</p> <p>Side View</p>	<p>Florida #2</p>
 <p>Top View</p> <p>Side View</p> <p>Cull</p>	<p>Cull</p>

Downgrading Factors



No central leader



Bad rooting