TOP FIVE REVISIONS TO THE 2014 NURSERY STOCK STANDARDS

The "Top 5" most important revisions to the 2004 edition are:

1. To make the Standard easier to use, new tables for each plant type include multiple specifications for each plant size, including minimum root ball size, various measurement ratios such as caliper:height or spread:height, minimum number of canes or branches, and minimum container class and in-ground fabric bag size.
2. Minimum requirements for all nursery stock in a new "General Standards" section include:

    - Good living condition.
    - Typical in habit for the species in the region of the country in which it is grown.
    - Correct identification (by genus, species and, if applicable, cultivar). (new)
    - Substantially free of damaging insects and diseases. (new)
    - Pruning cuts must be done in accordance with related consensus standards (ASC A300). (new)
    - Type 1 and Type 2 shade trees may not have co-dominant stems in the bottom half of the crown. (new)
3. Clarification of the method for measuring caliper and the relationship between root flare and the soil line.
4. Changes to specifications for in-ground fabric bags and expansion of their application to all plant types.
5. Recognition of containers that "encourage or manipulate root growth" and recognition of fabric as an acceptable container material.

HIGHLIGHTS

Aggregated Plant Type Tables

The tables in the 2004 edition of the Standard were structured to address a single specification for multiple plant types or to address a single specification of a single plant type. New plant type tables in the 2014 edition aggregate the majority of the specifications for each separate plant type, by plant size interval, including minimum root ball diameters and depths, various measurement ratios (e.g., caliper:height or spread:height), minimum number of canes or branches, minimum and maximum container classes, and minimum in-ground fabric bag size.

Minimum Acceptable Container Class Specifications

The 2004 container class (size) tables provided a range of plant sizes that corresponded to each container class, and specifiers were "encouraged to specify a container class in which the desired plant size falls between the minimum and maximum plant size (interval) shown." Conversely, the new plant type tables provide minimum and maximum container class specifications for each plant size (interval) specification.

As a result, to the extent that nursery stock has been grown, specified, and sold using the 2004 "maximum plant size" in the smallest container listed, the nursery stock might not comply with the applicable 2014 plant type table. However, it is important to note that such plant size:container class combinations would likely have "excessive root growth encircling the inside of the container," which was prohibited in the 2004 edition and is included in the 2014 edition.

New Section 1 - General Standards

The 2014 edition includes a new "Section 1 – General Standards" that applies to multiple (or all) plant types and is primarily compiled from text repeated in several plant type sections and in the Foreword of the 2004 edition.

Measuring Caliper – Long-standing text describing where caliper is measured has been revised to clarify that the "four inch" caliper size includes the entire interval "up to but not including four and one-half

inches," such that, "If the caliper measured at six inches is four and one-half inches or more, the caliper shall be measured at 12 inches above the ground level, soil line, or root flare, as appropriate.

Root Flare "at or near" Ground/Soil Line – Text has been added regarding the relationship between the root flare ("at or near") the soil level for consistency of the method for measuring caliper with the methods for measuring height and root ball depth that were in the 2004 edition. Growers should note that trees with root flares "at or near" the ground or soil line will have larger caliper and height measurements than trees with primary structural roots well below the ground or soil line and, therefore, higher value in the marketplace.

Minimum requirements for all nursery stock – the new 2014 General Standards section includes the following minimum standards:

- Good living condition.
- Typical in habit for the species in the region of the country in which it is grown.
- Correct identification (by genus, species and, if applicable, cultivar). (new)
- Substantially free of damaging insects and diseases. (new)
- Pruning cuts must be done in accordance with related consensus standards (ASC A300). (new)
- Type 1 and Type 2 shade trees may not have co-dominant stems in the bottom half of the crown. (new)

Fabric Bags

Several revisions to the 2004 edition relate to "fabric bags," including:

- Clarification throughout the 2014 edition that all references are to "in ground" fabric bags.
- Addition of "in-ground" fabric bag sizes under 10-inch diameter (5-inch and 8-inch).
- Addition of in-ground fabric bag size over 24-inch diameter (30-inch).
- Smaller depth minimums for in-ground fabric bag sizes in relation to diameter.
- Addition of in-ground fabric bag specifications for certain plant types that were not included in the 2004 edition.
- Recognition that fabric is an acceptable material for "above-ground" containers, as long as the root system meets the genera requirement for container-grown nursery stock (see "Recognition of Certain Containers," below).

Minimum Root Ball Diameters for Sheared Evergreens

The 2004 edition required minimum root ball diameter specifications for "sheared" evergreens to be determined by cross-reference to the minimum root ball table applicable to Type 1 and Type 2 shade trees. For some plant types, integrating the specifications from the 2004 shade tree table into the new plant type tables resulted in inconsistent minimum root ball specifications for sheared and non-sheared evergreens of the same caliper. There is no horticultural basis for requiring larger root balls (or containers or fabric bags) for sheared evergreens with the same caliper as natural or semi-sheared evergreens. The new evergreen plant type tables remove the cross-reference to the shade tree table for determining minimum root ball diameter.

Recognition of Certain Containers

The 2014 edition recognizes containers that are now generally accepted in the nursery trade designed to manipulate root growth by root pruning (e.g., by exposing the roots to air or treatment of the container wall) and root training (e.g., using vertical "ribs" to encourage roots to grow vertically rather than encircle the container). Also, these containers may be manufactured with materials other than plastic (e.g., fabric, similar to in-ground fabric bags), such that the fabric container and a well-developed root system work together to hold the ball shape and protect the integrity of the root system during handling – even though the fabric "container" standing alone is not a "rigid" structure.

The 2014 edition includes the following revisions:

- Eliminate the requirement in the 2004 edition that "the container shall be sufficiently rigid to hold the ball shape and protect the root mass during shipping"
- Add the following text (includes 2004 recognition of "treated" containers): "It is recognized that containers that encourage or manipulate root growth, such as the use of holes or fabric aeration to prune roots, coatings to prevent roots from reaching the sides of the container, or container shape to train roots to go in a certain direction, are acceptable in the trade."

DETAIL VERSION

Process used to revise the 2004 edition

The AmericanHort Horticultural Standards Committee considered potential revisions to the 2004 edition of the American Standard for Nursery Stock (ANSI Z60.1 – the "Standard") from 2005 to 2013. The "Canvass List," a group of 39 individuals and organizations who responded to a survey sent to almost 400 contacts indicating interest in reviewing and voting on the committee's proposed revisions, was finalized in September, 2013. On December 20, 2013, the committee's "initial draft revisions" were sent to the Canvass List and published by the American National Standards Institute (ANSI) for Public Review for a 90-day review and comment period. Based on comments received during the Canvass and Public Review process, the committee modified its initial draft revisions and sent the modifications to the Canvass List and had them published by ANSI for an additional Public Review period. At the close of the Canvass ballot and Public Review process, 100% of the Canvass ballots approved the committee's final proposed revisions to the 2004 edition, and no negative comments were received through the Public Review.

Summary of 2014 Revisions to the 2004 Standards

The description of the revisions to the 2004 edition of the Standard set forth below does not include corrections of typographical errors, numbering errors, grammar or syntax errors, formula or conversion errors, spelling errors, or editorial (non-substantive) clarifications to the 2004 text.

Aggregated Plant Type Tables

The tables in the 2004 edition of the Standard were structured to address a single specification for multiple plant types or to address a single specification of a single plant type. For example, one table showed minimum root ball diameters for all types of trees, and one table showed only the height:spread ratio for "Type 6" conifers. This structure required the user to locate multiple tables to determine a complete set of specifications for a particular plant type.

In order to increase the ease of use of the Standard, the new plant type tables in the 2014 edition aggregate the majority of the specifications for each separate plant type, by plant size interval, including minimum root ball diameters and depths, various measurement ratios (e.g., caliper:height or spread:height), minimum number of canes or branches, minimum and maximum container classes, and minimum in-ground fabric bag size.

Minimum Acceptable Container Class Specifications

The 2004 container class (size) tables were structured to provide guidelines for determining the appropriate container class specification for a particular plant size. A range of plant sizes corresponded to each container class, and specifiers were "encouraged to specify a container class . . . in which the desired plant size falls between the minimum and maximum plant size shown." In other words, the "maximum plant size" specifications in the 2004 "container class" tables were not intended to identify the "largest acceptable plant size specification in a particular container class." The aggregation of specifications in the new plant type tables noted above resulted in reversing the logic of specifying combinations of plant size and container class. The new aggregated plant type tables have been structured to provide the minimum and maximum "acceptable container classes" for each plant size (interval) specification.

As a result, many of the "acceptable container classes" in the new 2014 plant type tables do not include the smallest container for the "maximum plant size" interval shown in the 2004 container class tables. Therefore, to the extent that nursery stock has been grown, specified, and sold in accordance with the 2004 "maximum plant size" in the smallest container listed in the applicable 2004 container class table, the nursery stock might not comply with the applicable 2014 plant type table. However, it is important to note that the root systems for those maximum plant size-to-minimum container class combinations would likely have "excessive root growth encircling the inside of the container," in violation of both the 2004 and 2014 editions of the Standard.

New Section 1 - General Standards

In order to make the Standard easier to use and reduce the amount of redundant text in the 2004 edition, the 2014 edition includes a new "Section 1 – General Standards" that generally applies to all plant types and is almost entirely compiled from repeated text throughout the plant type sections and in the Foreword of the 2004 edition. Most of the following revisions represent clarification and editorial changes required as a result of combining similar text from multiple sections in the 2004 edition, but some revisions represent substantive changes, as noted.

Measuring Caliper – The following text has been moved from various sections in the 2004 edition to new Section 1 – General Standards and revised to clarify the correct interpretation and application of the text, but the revised text does not represent any substantive changes from the 2004 edition (explanation follows quoted text):

> *"For understock specified in accordance with Section 10 and seedling trees and shrubs specified in accordance with Section 11, caliper measurement shall be taken at the root collar or at other points expressly described in those sections.*
>
> *For all other nursery stock, caliper measurement shall be taken six inches above the ground level for field grown stock and from the soil line for container grown stock, which should be at or near the top of the root flare, and six inches above the root flare for bare root plants, up to and including the four-inch caliper size interval. If the caliper measured at six inches is four and one-half inches or more, the caliper shall be measured at 12 inches above the ground level, soil line, or root flare, as appropriate."*

The long-standing text describing where caliper is measured has been revised to clarify that the reference to the "four inch" caliper measurement includes the entire four inch caliper *interval*, meaning caliper measurements "from four inches up to but not including four and one-half inches," consistent with the use of plant size intervals throughout the Standard. The correct interpretation is to measure caliper at the six-inch mark until the caliper measures 4 ½ inches, exceeding the upper limit of the 4-inch caliper interval, at which point caliper should be measured at the 12-inch mark.

Text has been added regarding the relationship between the ground or soil line and the root flare for consistency of the method of measuring caliper with the method for measuring height and the method for measuring root ball depth, both of which were in the 2004 edition. Growers should note that trees with root flares "at or near" the ground or soil line will have larger caliper and height measurements than trees with root systems well below the ground or soil line and, therefore, higher value in the marketplace, and will be less likely to be rejected because root balls do not meet the minimum root ball depth requirement.
Multi-stem trees "default specification" – If specifications for multi-stem trees do not include the required specification for the minimum number of stems, "a three-stem tree shall comply with the specification."
Minimum requirements for all nursery stock – the new 2014 General Standards section compiles various "quality definitions" from multiple sections in the 2004 edition, and adds new minimum requirements for all nursery stock. The intent is to establish minimum standards that, if not met, provide the basis for rejection of nursery stock, even if the buyer's specifications or the supplier's written guarantee do not address them. Minimum standards at the time of a commercial transaction require:

- Good living condition.
- Typical in habit for the species in the region of the country in which it is grown.
- Correct identification (by genus, species and, if applicable, cultivar). (new)
- Substantially free of damaging insects and diseases. (new)
- Pruning cuts must be done in accordance with related consensus standards (ASC A300). (new)
- Type 1 and Type 2 shade trees may not have co-dominant stems in the bottom half of the crown. (new)

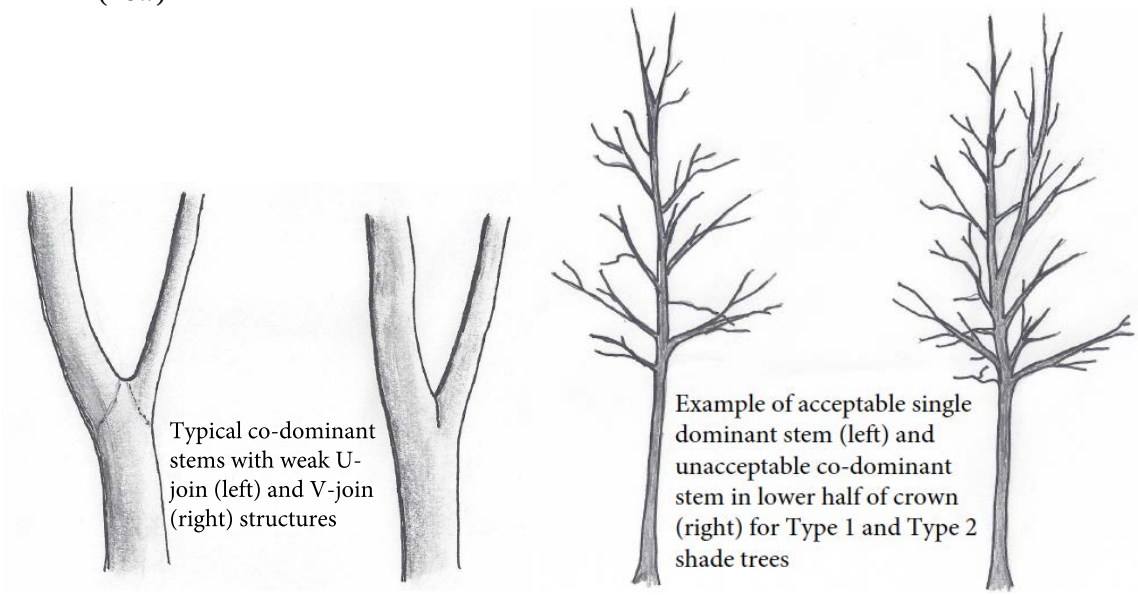

FIGURE 6: Co-dominant stems – Type 1 and Type 2 shade trees

Type 0 Tender Deciduous Shrubs

Specifications for Type 0 tender deciduous shrubs – Text has been added and 2004 text has been revised to recognize the exception to the rule that specifications must include plant size. Type 0 tender deciduous shrubs may be specified by container class only in order to allow plants to meet specifications in transactions that occur during dormancy or early in the season when limited growth is visible above the soil line.

Section 6 – Roses

Text was added to provide that roses grown on their own roots (not budded or grafted onto root stock), are specified as Type 0 deciduous shrubs.

Fabric Bags

Several revisions to the 2004 edition relate to "fabric bags," including:

- Clarification throughout the 2014 edition that all references are to "in ground" fabric bags
- Addition of "in-ground" fabric bag sizes under 10-inch diamter (5-inch and 8-inch)
- Addition of in-ground fabric bag size over 24-inch diameter (30-inch)
- Smaller depth minimums for in-ground fabric bag sizes in relation to diameter
- Addition of in-ground fabric bag specifications for certain plant types that were not included in the 2004 edition
- Recognition that fabric is an acceptable material for "above-ground" containers, as long as the root system meets the genera requirement for container-grown nursery stock (see "Recognition of Certain Containers," below)

Minimum Root Ball Diameters for Sheared Evergreens

The 2004 edition included the provision that minimum root ball diameter for "sheared" coniferous and broadleaf evergreens is determined by caliper rather than height or spread. The basis for requiring that caliper control the minimum root ball diameter (or container class or fabric bag size) for sheared evergreens is that the size of the root system required to support the plant continues to increase over time, such that limiting the height or spread of a plant over time through repeated shearing does not reduce the root system needed to support the plant.

The 2004 edition required minimum root ball diameter specifications for "sheared" coniferous and broadleaf evergreens to be determined by cross-reference to the minimum root ball table applicable to Type 1 and Type 2 shade trees. For some plant types, integrating the specifications from the 2004 shade tree table into the new plant type tables resulted in minimum root ball specifications that were larger for sheared evergreens than the minimum root ball specifications integrated from the 2004 tables for natural or semi-sheared evergreens with the same caliper.

The new evergreen plant type tables remove the cross-reference to the shade tree table for determining minimum root ball diameter. The size of the root system required to support the plant is determined by caliper, not by height or spread, and there is no horticultural basis for requiring larger root balls (or containers or fabric bags) for sheared evergreens with the same caliper as natural or semi-sheared evergreens.

Recognition of Certain Containers

The 2004 edition recognized acceptability in the trade of "treated containers" designed to prevent roots from reaching the inside surface of the container (in order to help prevent circling roots from forming), but other types of containers are now generally accepted in the nursery trade that manipulate root growth in other ways, including root pruning (e.g., by exposing the roots to air) and root training (e.g., using vertical "ribs" to encourage roots to grow vertically rather than encircle the container). Also, these containers may be manufactured with materials other than plastic (e.g., fabric, similar to in-ground fabric bags), such that the fabric container and a well-developed root system work together to hold the ball shape and protect the integrity of the root system during handling – even though the fabric "container" standing alone is not a "rigid" structure.

The 2014 edition includes the following revisions:

- Eliminate the requirement in the 2004 edition that "the container shall be sufficiently rigid to hold the ball shape and protect the root mass during shipping"
- Add the following text (includes 2004 recognition of "treated" containers): "It is recognized that containers with holes or made of fabric as a method of aeration to prune roots, or with coatings to prevent roots from reaching the sides of the container, or shaped to train roots to grow vertically rather than encircle the container, are acceptable in the trade."