

NURSERY PAPERS

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In this month's Nursery Paper, NGIA Policy and Technical Officer, Chris O'Connor examines the recently released Australian Standard AS2303:2015 Tree stock for landscape use.

After many years of discussion, debate and development, AS2303:2015 Australian Standard Tree stock for landscape use was introduced in April 2015. This paper will cover the need for a standard, some of the background in developing the standard, some of the key aspects of the standard and future developments for the standard.

The Need for a Standard

Standards are not new to the industry and most of industry would be aware of *AS4454:2012 Composts, soils conditioners and mulches* and *AS3743:2003 Potting mixes*, but let's look first at what a standard is. A standard is a document which sets specifications and/or procedures to ensure products, services or systems are safe, reliable and consistent. Standards also establish a common language for defining quality.

The industry should see the following outcomes from the implementation of the Australian Standard for tree stock for landscape use.

- Improved tree stock quality overall.
- Recognition for growers of high quality tree stock and a market driver for those growers.
- Consistent and nationally recognised specifications for growers, specifiers and purchasers of landscape tree stock.
- Increased support for the investment into and likelihood of success of green infrastructure projects.

It must also be noted that AS2303:2015 Tree stock for landscape use is NOT mandatory and is a voluntary standard.



Root circling is a tree stock defect which the standard addresses.

The Development of the Standard

The drivers and benefits of a standard for treestock have been long recognised, however it has taken a number of years to successfully establish a standard. The first attempt in creating a standard started in 2006 however failed by 2010 due to a lack of support and consensus. The second attempt in developing a standard was initiated in 2012 and this was successfully implemented in April of 2015.

The standard development was guided through consultation with the Standards EVO18 committee, as well as through public and industry consultation. The EVO18 committee saw representation from a wide range of stakeholders including;

- Arboriculture Australia
- Australian Institute of Horticulture
- Australian Institute of Landscape Architects
- Australian Local Government Association
- Institute of Australian Consulting Arboriculturists
- Local Government Tree Resources Association
- Nursery & Garden Industry Australia
- Parks and Leisure Australia
- TAFE NSW
- The University of Melbourne

Much of the standard has been based upon the previous work "Specifying Trees: A Guide to Assessment of Tree Quality" authored by Ross Clark and published by NATSPEC. This publication was and is still used by many in the industry as a method to evaluate tree quality and as a de-facto standard since its first edition was published some two decades ago in 1996. Readers who are familiar with this publication will no doubt see much commonality with the standard.

Terminology

For those not familiar with Australian Standards there are some key consistent terminologies used which readers must be familiar with. The first term is "shall", which is used to state a requirement which must be strictly followed in order to conform to a Standard. When this term is used there can be no deviation from that requirement, unless there is a specified tolerance. When standards are applied in legislation the term "must" is considered an equivalent.

The second term is "should" which introduces a suggestion or recommendation which is not a requirement, so it is not necessary to be followed in order to comply with the Standard. Likewise 'should not' and 'may not' are only suggestions and are not required to be complied with.



Stem bark ridges shall be convex

The third term “mandatory” is a term used to describe a provision of a Standard to which it is necessary to comply with so as to be able to claim compliance with the Standard. Examples of mandatory requirements include test requirements to be met or records to be kept.

The fourth term is “Normative” and this term describes an element of a Standard which must be conformed to in order to comply with a Standard. So it is similar to “mandatory” but applies to a whole element (part, section or appendix) which may demand multiple requirements, whereas mandatory applies to an individual requirement (a sentence or paragraph, a clause or a table).

The last term “informative” is a term used to describe an element (clause, note or appendix) of a Standard that gives additional information, recommendations and/or guidelines which is not mandatory. The information in an informative seeks to explain & clarify mandatory elements and provide assistance in complying with the standard.

The Standard in Detail

The Standard consists of 34 pages in total divided into four sections as well as a foreword and appendices.

- i. Foreword
- ii. Section 1 - Scope and General
- iii. Section 2 - Criteria for Tree Stock Assessment
 - a. Above ground assessment
 - b. Below ground assessment
- iv. Section 3 - Tree Stock Balance Assessment
- v. Section 4 - Testing
- vi. Appendices A - E



Staking is permissible and may be necessary in production, however stock in 45L pots or greater must be self supporting on dispatch

Foreword

The foreword contains a preamble which highlights the intent of the standard and provides some background to tree stock production and aspects of tree quality. It is noted in the foreword that the term tree covers a broad range of species which are highly variable and influenced by many factors. Bearing this in mind, the standard provides for a sound method of determining tree stock quality which is flexible in its application.

Section 1 - Scope and General

The first section of the standard covers the scope of the standard noting that it specifies criteria to assess above and below ground characteristics of tree stock supplied for landscape use. Also noted is that the standard applies to all methods of production systems covering container grown, containerised bare rooted and ex ground tree stock. Noted exceptions to the standard include palms and tree stock grown for topiary, espalier, bonsai, pollarding or coppicing, as well as tree stock transplanted from the landscape to place other than a production nursery.

The first section also covers the application of the standard and a detailed list of terms and definitions specific to this standard.

Section 2 - Criteria for tree stock assessment

The second section specifies the criteria for the above ground and below ground assessment of tree stock which are used in determining quality tree stock for landscape use. For the above ground assessment of tree stock a number of criteria are covered, some of which are noted below.

Firstly the tree or batch should be labelled with the correct botanical nomenclature (true to type) and the height and calliper of the tree recorded.

The tree should display good health considering the time of year, location and stage of growth. Considering these aspects, tree health can be demonstrated through crown cover, form and density, as well as leaf colour and size and the absence of epicormics shoots and dieback. The tree should also be free from significant injury and wounds apart from pruning conducted in accordance with AS 4373.

Crown Symmetry is considered, noting that differences in tree crown distribution on opposite sides of the stem axis are no greater than 20%.

Apart from atypical species, the stem calliper at any given point is less than the stem calliper at any lower point, in other words the stem tapers to the apex of the tree.

Moving onto stem structure, at any branch union the stem diameter above the branch union is greater than the diameter of the branch at the point of attachment. In tree stock with a defined central leader an apical bud must be intact and the stem doesn't deviate more than 15° from the vertical axis. For branch dominant tree stock the terminal buds must be intact and any unions are sound.

Although support through staking may be required during production, at the time of dispatch treestock in containers 45L or greater need to be self-supporting, for containers less than 45L the tree stock should be self-supporting.

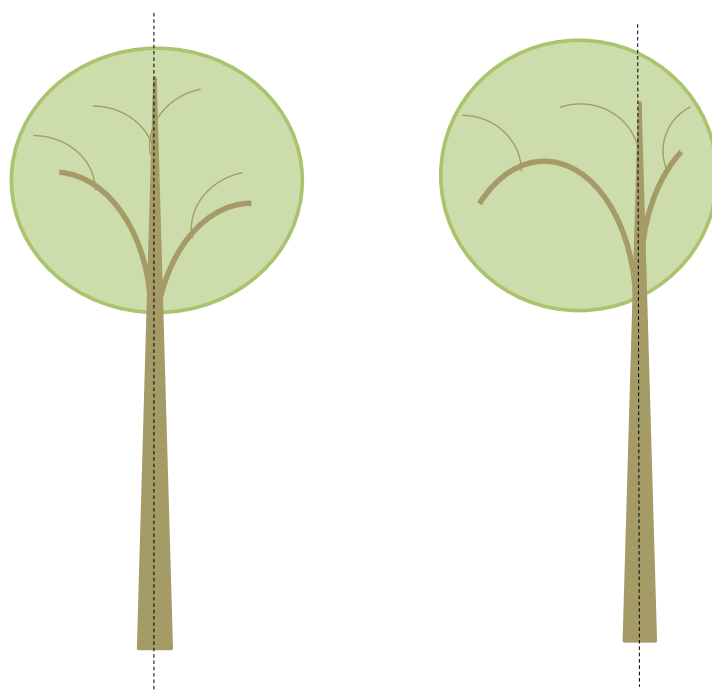
The standard notes that included bark (concave) shall not be present and stem or branch bark ridge unions are outwardly turned (convex). Included bark is where bark grows between the branches inside a branch union usually where two or more branches are growing closely together. Branch unions with included bark are more prone to failure than convex unions. Albeit some species may display included bark as a characteristic this should not detract from the aim to eliminate included bark from tree stock.

In grafted tree stock, the scion and rootstock must be compatible for the entire graft perimeter and the graft union sound. Additionally excluding bark and cleft grafts, the scion diameter immediately above the graft is within 20% of the rootstock diameter immediately below the graft.

The second major component of section two focuses on the below ground assessment requirements of tree stock. Some aspects of the below ground assessment are discussed in the following paragraphs.

Firstly the rootball must meet specific requirements for depth and diameter; for instance rootballs of containers 45L or greater should have a diameter greater than their depth, conversely however rootballs of tube and cell stock shall have a depth exceeding their diameter.

In relation to rootball occupancy, when removed from the container, 90% of the growing media volume needs to remain intact around the rootball. This can be assisted by the requirement that treestock in containers 45L or less have undergone primary root division at least once and that tree stock in larger containers must have undergone primary root division at multiple intervals.



The tree on the left demonstrates a symmetrical crown, whilst the tree on the right demonstrates an asymmetrical crown with more than 20% difference in distribution.

Roots need have grown in an outward and downwards direction and there is to be no evidence of circling roots, girdle roots kinked roots or j-roots. Roots must also not display signs of suckering at the time of dispatch.

Finally for both above and below ground assessments the tree should show no evidence of active pests or diseases or weeds. It is noted that the Nursery Production Farm Management System contains information on the management of pests and diseases.

Section 3 - Tree stock balance assessment

The third section of the standard relates to the tree stock balance assessment. The tree stock balance assessment is a guide to assess tree stock grown in containers of greater than 20L or ex-ground treestock. It is a way of describing the proportional relationship between the above and below ground aspects of the tree stock factoring in tree height and stem calliper (size index) as well as the rootball volume.

The size index of tree stock is a good indicator of the self-supporting nature of trees and likewise a sufficient rootball volume also contributes to the trees ability to support itself in the landscape.

To determine the tree stock balance, firstly the ratio of height to calliper or size index needs to be calculated by multiplying the height of the tree in metres by the calliper in millimetres. The resulting size index figure is then applied to a table in appendix E which gives a nominal container size appropriate for the tree stock based upon a size index range.

It is noted in the standard that tree stock are living products and hence species, production processes and climatic conditions can influence the height/calliper ratio. Hence it is important to understand that the tree stock balance assessment should not be used in isolation and rather it should inform a part of a holistic assessment of tree quality.

Section 4 - Testing

The fourth section covers testing methods to demonstrate compliance with the standard and the retention of documentation. The three listed methods of compliance demonstration include; testing at dispatch, internal nursery production systems which ensure compliance with the standard and as part of an audited quality assurance (QA) program.

Appendices

The standard contains 5 appendices, with A & B being normative and appendices C, D & E being informative.

Appendix A covers sampling strategies based upon AS 1199.1 suggesting the number of trees to sample based upon the size of the production batch. The testing process for treestock analysis is also covered by this appendix. Moving on Appendix B details the procedures and test report requirements for assessing rootball occupancy and root division and direction at the time of dispatch.

Appendix C provides two examples of treestock inspection forms which may be used or modified for recording inspection data.

Appendix D is an informative appendix which provides guidance on treestock height and calliper measurements and expected rootball diameters. Three categories are presented for tall slender species, general species and stockier thick stemmed species.

Appendix E is an informative table used in conjunction with section 3 to offer advice on the nominal container sizes for specific size index ranges.

The standard moving forward

The major area of contention during the formation of the standard, centred on the tree stock balance concept and its calculation as it applies to varying production regions and across various species. As noted in the standard, NGIA committed to undertake research to evaluate the tree stock balance parameters across all climatic regions of Australia. This research has been successfully tendered by Horticulture Innovation Australia and will be conducted by Western Sydney University through a levy funded research project. The project is expected to conclude in March 2017 and the results will be used to guide a future update of the standard.

AS 2303:2015 Tree stock for landscape use is available for purchase from the SAI Global store online at <http://infostore.saiglobal.com/store/Details.aspx?ProductID=1796682> and it is highly recommended that tree growers purchase this standard for use in their business.

For further information on Australian Standards please refer to the standards website www.standards.org.au

References and further reading

Standards Australia 2015, *AS 2303:2015 Tree stock for landscape use* available from www.standards.org.au

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