A300 (Part 2) Draft 2 Version 1 *Fertilization* Pub Rev 2 12'08-2'09

for Tree Care Operations –
Tree, Shrub, and Other Woody Plant Management –
Standard Practices *(Fertilization)*

Secretariat
Tree Care Industry Association, Inc.

Published by
Tree Care Industry Association, Inc.
136 Harvey Road – Ste 101
Londonderry, NH 03053
800-733-2622
603-314-5380
Fax: 603-314-5386
E-mail: Rouse@tcia.org
Web: www.treecareindustry.org

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Foreword (This foreword will not be considered part of the revised and approved A300 Part 2 American National Standard)

ANSI A300 Standards are divided into multiple parts, each focusing on a specific aspect of woody plant management (e.g. Pruning, Fertilization, etc).

These standards are used to develop written specifications for work assignments. They are not intended to be used as specifications in and of themselves. Management objectives may differ considerably and therefore must be specifically defined by the user. Specifications are then written to meet the established objectives and must include measurable criteria.

ANSI A300 standards apply to professionals who provide for or supervise the management of trees, shrubs, and other woody landscape plants. Intended users include businesses, government agencies, property owners, property managers, and utilities. The standard does not apply to agriculture, horticultural production, or silviculture, except where explicitly noted otherwise.

This standard has been developed by the Tree Care Industry Association (TCIA), an ANSI-accredited Standards Developing Organization (SDO). TCIA is secretariat of the ANSI A300 standards, and develops standards using procedures accredited by the American National Standards Institute (ANSI).

Consensus for standards writing was developed by the Accredited Standards Committee on Tree, Shrub, and Other Woody Plant Management Operations – Standard Practices, A300 (ASC A300).

Prior to 1991, various industry associations and practitioners developed their own standards and recommendations for tree care practices. Recognizing the need for a standardized, scientific approach, green industry associations, government agencies and tree care companies agreed to develop consensus for an official American National Standard.

The result – ANSI A300 standards – unify and take authoritative precedence over all previously existing tree care industry standards. ANSI requires that approved standards be developed according to accepted principles, and that they be reviewed and, if necessary, revised every five years.

TCIA was accredited as a standards developing organization with ASC A300 as the consensus body on June 28, 1991. ASC A300 meets regularly to write new, and review and revise existing ANSI A300 standards. The committee includes industry representatives with broad knowledge and technical expertise from residential and commercial tree care, utility, municipal and federal sectors, landscape and nursery industries, and other interested organizations.

This draft is in a public review period from December 19, 2008 to February 2, 2009.

This draft is not approved as a draft for trial use. Official comments regarding this draft standard must be forwarded to: Rouse@tcia.org, A300 Secretary, c/o Tree Care Industry Association, Inc., 136 Harvey Road - Suite 101, Londonderry, NH, 03053.

The ASC A300 committee contains the following members as of December 19, 2008:

Tim Johnson, Chair
(Artistic Arborist, Inc.)

Bob Rouse, Secretary
(Tree Care Industry Association, Inc.)

Organizations Represented	Name of Representative
American Nursery and Landscape Association	Warren Quinn
	Craig J. Regelbrugge (Alt.)
American Society of Consulting Arborists	Donald Zimar
American Society of Landscape Architects	Ron Leighton
Asplundh Tree Expert Company	Geoff Kempter
	Peter Fengler (Alt.)
Bartlett Tree Expert Company	Peter Becker
	Dr. Thomas Smiley (Alt.)
Davey Tree Expert Company	Joseph Tommasi
	R.J. Laverne (Alt.)
International Society of Arboriculture	Bruce Hagen
	Sharon Lilly (Alt.)
National Park Service	Robert DeFeo
	Dr. James Sherald (Alt.)
Professional Grounds Management Society	Thomas Shaner
Professional Land Care Network	Preston Leyshon
Society of Municipal Arborists	Gordon Mann
	Andy Hillman (Alt.)
Tree Care Industry Association	Dane Buell
	James McGuire (Alt.)
USDA Forest Service	Keith Cline
	Ed Macie (Alt.)
Utility Arborist Association	Matthew Simons
	Jeffrey Smith (Alt.)

Additional organizations and individuals:
American Forests (Observer)
Mike Galvin (Observer)
Peter Gerstenberger (Observer)
Dick Jones (Observer)
Myron Laible (Observer)
Beth Palys (Observer)

Richard Rathjens (Observer)
Richard Roux (NFPA-780 Liaison)

ASC A300 mission statement:

Mission: To develop consensus performance standards based on current research and sound practice for writing specifications to manage trees, shrubs, and other woody plants.

Cause 1 excerpted from ANSI A300 (Part 1) **Pruning.**

1 Scope, purpose, and application

1.1 Scope

ANSI A300 standards present performance standards for the care and maintenance of trees, shrubs, and other woody plants.

1.2 Purpose

ANSI A300 standards are intended as guides for federal, state, municipal, and private authorities including property owners, property managers, and utilities in the drafting of their maintenance specifications.

1.3 Application

ANSI A300 standards shall apply to any person or entity engaged in the business, trade, or performance of repairing, maintaining, or preserving trees, shrubs, or other woody plants.

1.4 Implementation

Specifications for tree maintenance should be written and administered by an arborist.

10 Part 2 – Fertilization standards

10.1 Purpose

The purpose of this clause is to provide standards for developing specifications for fertilization.

10.2 Reason for fertilization

The reason for fertilization is to supply nutrients determined to be deficient to achieve a clearly defined plant management objective. That objective should be accomplished in the manner most beneficial to the plant and the environment.

Fertilization practices for agricultural, horticultural production, or silvicultural purposes are exempt from this standard unless this standard, or a portion thereof, is expressly referenced in standards for these other related areas.

10.3 Safety

10.3.1 Tree maintenance shall be performed only by arborists or arborist trainees who, through related training or on-the-job experience, or both, are familiar with the practices

and hazards of arboriculture and the equipment used in such operations.

10.3.2 This standard shall not take precedence over arboricultural safe work practices.

10.3.3 Operations shall comply with applicable Occupational Safety and Health Administration (OSHA) standards, ANSI Z133.1, as well as state and local regulations.

11 Normative references

The following standards contain provisions that, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

ANSI Z60.1, Nursery stock

ANSI Z133.1, *for Arboricultural Operations – Safety Requirements*

29 CFR 1910, General industry [1)]

29 CFR 1910.268, Telecommunications [1)]

29 CFR 1910.269, Electric power generation, transmission, and distribution [1)]

29 CFR 1910.33-335, Electrical safety-related work practices [1)]

[1)] Available from U.S. Department of Labor, 200 Constitution Ave., NW, Washington, DC 20210.

12 Definitions

12.1 arborist: An individual engaged in the profession of arboriculture who, through experience, education and related training, possesses the competence to provide for, or supervise the management of, trees and other woody ornamentals.

12.2 arborist trainee: An individual undergoing on-the-job training to obtain the experience and the competence required to provide for, or supervise the management of, trees and woody ornamentals. Such trainees shall be under the direct supervision of an arborist.

12.3 drip line: A boundary on the soil surface delineated by the branch spread of a single plant or group of plants.

12.4 fertilization: The application of fertilizer to the soil or plant.

12.5 fertilizer: A substance containing one or more nutrients to be added to a plant or surrounding soil to supplement the supply of essential elements.

12.6 fertilizer analysis: The composition of a fertilizer expressed as a percentage by weight of total nitrogen (N), available phosphoric acid (P_2O_5), soluble potash (K_2O), and other nutrients.

12.7 fertilizer ratio: The ratio of total nitrogen (N), available phosphoric acid (P_2O_5), and soluble potash (K_2O); e.g., the ratio of a 30-10-10 fertilizer is 3:1:1.

12.8 implant: A capsule or other device permanently inserted into the xylem.

12.9 nutrient: Element or compound required for growth, reproduction or development of a plant.

12.9.1 macronutrient: Nutrient required in relatively large amounts by plants, such as nitrogen (N), phosphorus (P), potassium (K), and sulfur (S).

12.9.2 secondary nutrient: Nutrient required in moderate amounts by plants, such as calcium (Ca) and magnesium (Mg).

12.9.3 micronutrient: Nutrient required in relatively small amounts by plants, such as iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), and boron (B).

12.10 quick-release fertilizer: A fertilizer that is immediately available to the plant.

12.11 salt index: A measure of the salt concentration that fertilizer produces in the soil solution. The higher the salt index, the more likely that plant damage will occur.

12.12 slow-release fertilizer: A fertilizer containing plant nutrients in a form that delays availability for plant uptake and use after application, or that extends availability to the plant.

12.13 soil modification: Physically or chemically altering soils to improve conditions such as pH, drainage, aeration.

12.14 subsurface application: The application of dry or liquid fertilizer below the soil surface.

12.15 surface application: The application of dry or liquid fertilizer to the soil surface, mulch or ground cover.

12.16 trunk injection: The process of injecting a liquid into the plant.

12.17 water-insoluble nitrogen (WIN): Nitrogen not readily soluble in cold water.

13 Fertilization practices

13.1 Fertilizer safety precautions shall be followed for all products.

13.2 Materials shall be used in accordance with federal, state, and local regulations.

13.3 Fertilization objectives shall be established prior to beginning any fertilizing operation.

13.4 To achieve the defined objective, site factors shall be considered, including proximity to waterways, past fertilization practices, slope, and irrigation.

13.5 The types and rate of fertilizer – as well as timing, method, and location of application – shall be specified to achieve a clearly defined plant management objective.

13.6 Soil and/or foliar nutrient analysis should be used to determine the need for fertilizer.

13.7 Soil pH shall be considered when selecting the fertilizer.

13.8 New transplants and plants sensitive to fertilizer salt should only be fertilized with a slow-release fertilizer.

13.9 Plant conditions such as disease, insect infestations and herbicide damage shall be considered.

13.10 Soil modification to improve nutrient uptake shall be considered prior to fertilization.

14 Fertilizer applications

14.1 When to fertilize

Applications should be timed to meet management objectives.

14.2 Types and rates of fertilizer

14.2.1 Fertilizer ratio should be adjusted based on condition and age of the plant, local knowledge, nutrient analysis, site conditions, and/or species.

14.2.2 In the absence of soil and/or foliar nutrient analysis, fertilizers with higher ratios of P_2O_5 and K_2O should be avoided.

14.2.3 Slow-release fertilizers with a minimum 50 percent WIN should be preferred due to site considerations and plant sensitivity.

14.2.3.1 Slow-release fertilizers should be applied at rates between 2 and 4 pounds of actual nitrogen per 1000 ft^2 (1 to 2 kg N/100 m^2) and should not exceed 6 pounds of actual nitrogen per 1000 ft^2 (2.9 kg N/100 m^2) within 12 months.

14.2.3.2 The amount of WIN shall be considered.

14.2.4 Quick-release fertilizers should be applied at rates between 1 and 2 pounds of actual nitrogen per 1000 ft^2 (0.5 to 1 kg N/100 m^2) per application and shall not exceed 4 pounds actual nitrogen per 1000 ft^2 (2 kg N/100 m^2) every 12 months.

14.2.5 Fertilizers with a salt index of less than 50 should be preferred.

14.3 Fertilization area

14.3.1 The fertilization area shall be defined prior to application. Consideration shall be given to root accessibility, root location, fertilization objectives, plant species, and site considerations.

14.3.2 For most trees and shrubs, the fertilization area should be from near the trunk to near or just beyond the drip line. Inaccessible surfaces shall not be included in the rate calculation.

14.3.3 For fastigiate trees and unusual situations, the method for determining the fertilization radius is by multiplying the plant's diameter at 4 ½ feet (1.4 m) above ground, measured in inches (cm), by 1 to 1½ (0.12 to 0.18) to determine the radius, expressed in feet (m), from the trunk of the plant.

For example, a 15-inch (38.1 cm) DBH tree would have a fertilization area radius of 15 to 23 feet (4.6 to 6.9 m).

14.4 Surface application

14.4.1 Fertilizer shall be uniformly distributed within the defined fertilization area.

14.4.2 Where turf or ground covers exist, subsurface fertilization should be the preferred method of fertilization.

14.4.3 Surface application shall not be made where surface runoff is likely to occur.

14.5 Sub-surface dry fertilization

14.5.1 Damage to the buttress roots should be avoided.

14.5.2 Holes shall be evenly spaced within the defined fertilization area.

14.5.3 Hole depth, diameter, and spacing shall be specified. Holes should be 2 to 4 inches (5 to 10 cm) in diameter, spaced 12 to 36 inches (30 to 91 cm) apart, and 4 to 8 (10 to 20 cm) inches deep.

14.5.4 The fertilizer shall be evenly distributed among the holes.

14.5.5 Fertilizer should not be closer than 2 inches (5 cm) to the soil surface.

14.6 Sub-surface liquid fertilizer injection

14.6.1 Damage to the buttress roots should be avoided.

14.6.2 Injection sites shall be evenly spaced within the fertilization area.

14.6.3 Injection site spacing and depth shall be specified. Injection sites should be 12 to 36 inches (30 to 91 cm) apart, and 4 to 8 inches (10 to 20 cm) deep, not to exceed 12 inches (30 cm) deep.

14.6.4 Fertilizer shall be evenly distributed among the injection sites.

14.7 Alternative fertilization techniques

14.7.1 All products shall be used in accordance with manufacturers' recommendations.

14.7.2 Foliar applications, trunk injections, or implants shall only be used when soil application of fertilizer is impractical or ineffective in achieving fertilization objectives. Fertilizer specified shall be formulated for the application method.

14.7.3 When applying foliar fertilizer, the fertilizer solution should be sprayed to thoroughly cover the foliage at the proper stage of growth to achieve fertilization objectives.

14.7.4 Injections and implants

14.7.4.1 Timing of injection/implant application should be at the proper growth stage to achieve fertilization objectives.

14.7.4.2 Products should be applied in the root flare or as low as practical in the trunk.

14.7.4.3 Holes shall be made as small and shallow as practical.

14.7.4.4 Application intervals should be timed to optimize results with minimal negative impact.

14.7.4.5 Small diameter trees and drought-stressed trees should not be treated

with injections or implants.

14.7.4.6 If a drill is used to create injection/implant sites, then sharp bits shall be used.

ASC A300 Note: An annex with a specification writing flow chart and A300 interpretations will be provided.