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An American National Standard

Standard Guide for Construction and Maintenance of Grass Tennis Courts[1]

This standard is issued under the fixed designation F1953; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers techniques that are appropriate for the construction and maintenance of grass tennis courts. This guide provides guidance for selection of soil systems and turfgrass species in court construction and for selection of management practices that will maintain an acceptable playing surface.

1.2 Decisions in selecting construction and maintenance techniques are influenced by existing soil types, climatic factors, adaptation of grass species, level of play anticipated, intensity of use, budget, equipment, and training and ability of the turf management personnel.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C33 Specification for Concrete Aggregates

D422 Test Method for Particle-Size Analysis of Soils (Withdrawn 2016)[3]

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D1140 Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing

D5268 Specification for Topsoil Used for Landscaping and Construction Purposes

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

F405 Specification for Corrugated Polyethylene (PE) Pipe and Fittings (Withdrawn 2015)[3]

F2651 Terminology Relating to Soil and Turfgrass Characteristics of Natural Playing Surfaces (Withdrawn 2024)[3]

3. Terminology

3.1 *Definitions*—Except as noted, soil and turfgrass related definitions are in accordance with Terminology F2651.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *reel mower (also 'reel-type' mower), n*—a machine for cutting grass composed of a cylinder, formed of blades mounted on a horizontal axis. The reel consists of a number of helix-shaped blades which are attached to support spiders which are subsequently mounted on a rotating shaft. During operation the reel blades turn to contact a bedknife which executes a scissors-like cutting action. Properly performed and well-maintained, reel mowers are particularly adapted to a higher mow quality and close cutting action (often to mow heights of less than 2.5 mm (<1⁄10 in.)) compared to other types of mowers.

3.2.2 *winter overseeding*—the practice of overseeding a cool-season turfgrass into a warm-season turfgrass stand at or near their start of winter dormancy for the purpose of providing a green, growing turf during the winter period when the warm-season species are brown and dormant.

4. Significance and Use

4.1 A grass tennis court should provide a relatively uniform, high quality playing surface as it relates to footing and ball bounce. Undulations, rough surface, bare spots, weeds, and wet spots detract from good play. Playing surface quality is largely affected by construction and maintenance procedures, and this guide addresses those procedures.

4.1.1 During construction, consideration should be given to factors such as soil physical and chemical properties, freedom of large stones and debris in the soil, surface and internal

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

drainage, grass species selection, orientation of the court, and provisions for distributing wear on the playing surface.

4.1.2 Maintenance practices that influence the playability of the surface include mowing height, mowing frequency, rolling, irrigation, fertilization, weed control, disease and insect control, cultivation, thatch control, topdressing, and overseeding.

4.2 Those responsible for the design, construction, or maintenance, or a combination thereof, of tennis courts will benefit from this guide.

4.3 This guide provides flexibility in choices of procedures and can be used to cover a variety of use and budget levels.

5. Construction

5.1 *Soil*—Soil may be the existing topsoil or a sandy rootzone prepared by mixing sand with soil.

5.1.1 Existing or native soils used for tennis courts should be well drained. Well drained soils are often medium textured. Avoid poorly drained soils, which remain wet for significant periods during the growing season. Poorly drained soils may possess a layer of soil with slow permeability, a high water table, additional water from seepage, or a combination of these properties. The presence of soil mottling (spots of different colors: for example, yellowish, reddish, grayish, brownish) indicates poor drainage and limited aeration in a soil. Coarse textured, excessively drained soils can be used, but irrigation must be provided because these soils have limited capacity to hold plant available water. County soil survey reports, available for inspection at local offices of the United States Department of Agriculture or at county cooperative extension offices, can be used to obtain information on the properties of natural soils at a given location. Relationships between general textural terms, textural classes, and permeability are shown in Appendix X1. In some cases, consideration may be given to modifying fine- or medium-textured soils by adding and incorporating sand into the surface to obtain 8 to 12 cm of modified soil (rootzone). The amount of sand required to effectively modify a soil (to increase permeability) will vary depending on the soil and sand properties; however, a minimum of 60 % sand on a volume basis will probably be needed to ensure good internal drainage when the soil is compacted (**1**).[4] Prior to turf establishment, apply lime and fertilizer as required, based on soil test results. During final surface preparation, all debris and any stones greater than 1 cm in diameter should be raked from the surface 1.5 cm of soil.

5.1.2 Artificial (man-made) profiles are often used on highly-trafficked turfgrass areas. In general, a coarse-textured topsoil or a rootzone, prepared by mixing soil and sand to obtain a well-drained growing medium, is placed on a drainage blanket of gravel, which provides subsurface drainage. A false water table is formed at the interface of the rootzone and the drainage layer. Water will not move readily from the finer-textured rootzone into the gravel layer until the water content is at or near saturation at the interface. If fine- or medium-textured soils are used for the rootzone in such profiles, they will remain too wet; however, in the case of coarse-textured rootzones, the increased water retention is a benefit. Such profiles are commonly used for golf putting greens (**2**). If the particle size differential between the topsoil and gravel layer is great, an intermediate layer is placed on the gravel to prevent in-washing of the rootzone. Some soil laboratories test soils for use on putting greens. Their services could also be used to evaluate soils for tennis courts, especially when modified-soil rootzone profiles will be used. Steps in constructing a tennis court with a modified-soil rootzone profile follow:

5.1.2.1 Excavate to a depth equal to the depth of settled layers within the profile (approximately 40 cm). Compact the subgrade. The subgrade should be parallel to the finished grade, which should have a slope of 0.8 to 1.0 % to provide surface drainage. The slope may be either widthwise or lengthwise, depending on site.

5.1.2.2 Excavate trenches (approximately 20-cm wide and 20-cm deep) in compacted subgrade for drainage pipe (lateral and main lines), with no more than 10 m between laterals. Remove excavated material or spread it evenly over the subgrade between trenches. Drainage pipe should have a diameter of approximately 10 cm. Corrugated, perforated, plastic drainage pipe (tubing) conforming to Specification F405 is recommended. Non-perforated pipe can be used outside the drainage area to carry water to a suitable surface drainage area or storm drain.

5.1.2.3 Place drainage pipe on a 5 to 10-cm bed of gravel in trenches. Minimum grade for drainage pipe is 1.0 %. Use laser or other appropriate equipment to maintain accurate grades.

5.1.2.4 Cover the drainage pipe and subgrade with a 7 to 10-cm layer of washed gravel or crushed rock. Do not use soft or easily-weathered materials in this layer. Gravel should consist of hard, durable particles of natural gravel or crushed stone or rock that will not degrade when alternately wetted and dried or frozen and thawed. The particle size of the gravel should meet the following specifications.

(1) Ninety to 100 % (weight basis) passing 12.5-mm (0.5-in.) sieve.

(2) Minimum of 50 % passing 9.5 mm (0.375 inch) and retained on 6.3-mm (0.25-in.) sieve.

(3) Maximum of 10 % passing 2.36-mm (No. 8) sieve.

(4) Uniformity coefficient: $^{d}90/^{d}10 \leq 3$ ($^{d}90$ and $^{d}10$ refer to the diameter below which 90 % and 10 % of the particles fall, as determined from a particle size accumulation curve.

(5) Coarse aggregate size Nos. 7 and 8 (see Specification C33) should receive consideration.

(6) Grading requirements for size Nos. 7 and 8 are as follows:

Sieve Designation	Size	
	7	8
	% passing	
19.0 mm (0.75 in.)	100	. . .
12.5 mm (0.50 in.)	90 to 100	100
9.5 mm (0.375 in.)	40 to 70	85 to 100
4.75 mm (No. 4)	0 to 15	10 to 30
2.36 mm (No. 8)	0 to 5	0 to 10
1.18 mm (No. 16)	. . .	0 to 5

5.1.2.5 Place intermediate layer of 5 to 7-cm thickness on the gravel layer. Material in this layer should have a minimum

[4] The boldface numbers in parentheses refer to the list of references at the end of this standard.