



Standard Guide for Maintaining Warm Season Turfgrasses on Athletic Fields¹

This standard is issued under the fixed designation F2269; 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 the minimum requirements for maintaining warm-season turfgrasses used for natural surface athletic fields. Practices covered include mowing, fertilization, irrigation, core cultivation, winter overseeding, pest management, and requirements for management of dormant turf winter overseeded with cool-season turf (see also Guide F2060).

1.2 The decisions involved in maintaining a quality natural playing surface should consider soil types, local climate and other factors. Therefore, it is recommended that you contact your local cooperative extension service for more specific information on soils, and grass species and cultivars adapted to your area.

1.3 The values stated in SI units are to be regarded as the standard. The values in parentheses are for information only.

1.4 *This standard may involve hazardous materials, operations, and equipment. 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 and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

F2060 Guide for Maintaining Cool Season Turfgrasses on Athletic Fields

F2651 Terminology Relating to Soil and Turfgrass Characteristics of Natural Playing Surfaces

3. Terminology

3.1 *Definitions:*

¹ This guide is under the jurisdiction of ASTM Committee F08 on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee F08.64 on Natural Playing Surfaces.

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

3.1.1 Except as noted, soil-related and turfgrass-related definitions are in accordance with Terminology F2651.

4. Significance and Use

4.1 A dense, uniform stand of turfgrass on a playing surface improves the playing quality and safety of the field by providing firm footing for the athletes and by cushioning their impact from falls, tackles or slides. These standards are the minimum inputs required to provide such a surface. Various published guides have been used in the development of this standard (1-8).³

4.2 Field conditions may directly influence the frequency and type of athletic injuries occurring as a result of using the fields. While these standards do not guarantee that such injuries will be prevented, a well maintained turf on a natural playing surface should minimize field-related injuries.

5. Apparatus

5.1 *General*—Experience and good judgment are important to match the proper type of equipment to the nature of the task to be performed.

5.1.1 *Mowing Equipment*—Mower types include reel, rotary, and flail; although the latter type is not recommended for fine playing surfaces. A reel mower should be used for playing surfaces requiring mowing at less than 2.5 cm (1.0 in.). Mower blades should always be kept sharp and properly adjusted in accordance to manufacturer's recommendations. Mowing equipment should be operated in a speed range (ground and engine speed) consistent with the manufacturer's recommendation.

5.1.2 *Spreaders*—Spreaders are necessary if dry fertilizer or pest control materials are to be applied. Spreader types may include drop, rotary (centrifugal, spinner), or oscillating. Spreaders should be calibrated to deliver the desired, labeled, or recommended rate of fertilizer or pest control product being applied.

5.1.3 *Sprayers*—Sprayers are necessary if liquid fertilizers or pest control materials are to be applied. Low pressure systems are recommended. Sprayers should be calibrated to deliver the desired, labeled, or recommended rate of fertilizer or pest control product being applied.

³ The boldface numbers in parentheses refer to the list of references at the end of this standard.

5.1.4 *Core Cultivators*—Core cultivation (aerification, coring) equipment relieves soil surface compaction. Core cultivators should be of the type that physically removes soil, such as a hollow tine or spoon. Cultivators with 1.3 to 1.9 cm ($\frac{1}{2}$ to $\frac{3}{4}$ in.) tines on spacing not more than 15 cm (6 in.) should be used on all playing surfaces. Spikers, slicers, or similar types of equipment are not as effective for relieving surface compaction. In addition to soil compaction found immediately at surface, the mechanical aeration practices may be performed such that the aeration tines penetrate to a depth sufficient to disrupt compacted layers. The effectiveness of such practices will depend upon equipment capabilities and adjustment.

5.1.5 *Seeders*—Broadcast or slit seeders should be used for any overseeding or renovation operations. Slit seeders cut a groove into the soil and deposit the seed in the groove at a predetermined depth. To achieve the same results, broadcast seeders will require a higher rate of seed application due to less effective seed-to-soil contact. Additionally, a broadcast seeded field will generally require more irrigation to effectively germinate seed compared to slit seeded fields. Seeding of bare soils can be accomplished by broadcast seeders, drop seeders, or slit seeders but each method will require a mulch for effective germination. Hydroseeding methods can be used effectively to apply seed and mulch in a hydrosurry to a bare soil surface but is not effective as a winter overseeding practice on existing turf.

5.1.6 *Irrigation System or Equipment*—Ideally some source of water should be available for irrigation. Systems can range from portable or permanently installed types.

5.1.7 *Soil Sampling Tube*—Used to sample soils for testing purposes.

6. Mowing

6.1 *Mowing (General)*—The periodic removal of excess shoot growth is necessary on natural surface playing fields.

6.2 *Mowing Height*—The mowing height of a natural surface athletic field will vary with the sport, turfgrass species, and time of the year. Adjust mowing heights accordingly, using the chart below:

Sports Field Use	Grass Species	Mowing Height
Baseball/Cricket Infields, Field Hockey Fields	hybrid bermudagrass, zoysiagrass, or seashore paspalum	6.4 to 19 mm (0.25 to 0.75 in.)
Baseball/Cricket/Softball Outfields; Soccer, Football, Lacrosse, Polo, and Rugby Fields; Intramural and Multiple-use Fields	hybrid bermudagrass, zoysiagrass, or seashore paspalum;	19 to 38 mm (0.75 to 1.5 in.)
	common bermudagrass, kikuyagrass;	38 to 64 mm (1.5 to 2.5 in.)
	bahiagrass	64 to 102 mm (2.5 to 4 in.)

NOTE 1—Adjustments in mowing height should be made to accommodate the sport using the field. Mowing heights should be increased by 25 % when the fields are not being used, or when the mowing height does not influence the game. A modest increase in mowing height adds photosynthetic leaf area to the turf canopy and may increase turf health and assist recovery rates of worn fields.

6.3 *Mowing Frequency*—Fields should be mowed as often as necessary. No more than $\frac{1}{3}$ of the leaf surface should be cut

off at any one mowing. Under normal growing conditions, this usually means every 5 to 7 days for fields maintained at 3.8 cm (1.5 in.) or higher, and two or three times a week for baseball infields and other closely mowed fields.

6.4 *Clipping Removal*—Fields maintained at a mowing height of 2.5 cm (1 in.) or higher do not require that the clippings be removed at mowing if mowed at the proper frequency interval. Only remove clippings if the grass is allowed to grow excessively high so that clippings would accumulate on the playing field surface. Playing surfaces maintained at one inch or shorter should have the clippings removed with each mowing.

6.5 *Mowing Pattern*—Mowing direction should be varied with each successive mowing. Striping of fields due to mowing direction can be accomplished with one or two mowings prior to an event.

NOTE 2—Seashore paspalum is the only warm-season turf that will produce a significant striping effect. Overseeded cool-season turfs may also produce a striping effect.

7. Fertilization

7.1 *Fertilization (General)*—Fertilization is essential for maintaining dense, vigorously growing natural turfgrass fields. Fertilizer rate, timing, source, and ratio will influence a natural turf's density, color, uniformity, and recuperative ability, as well as its ability to tolerate wear, biological and environmental stresses.

7.2 *Soil Testing*—Soil testing should be performed on established fields every three to four years. More frequent testing (once or more per year) may be required on sand-based fields or those having nutritional imbalances. Soil testing will identify nutrient deficiencies that may be corrected by supplemental fertilizer applications or by fertilizer selection. Soil testing will also identify changes needed in soil reaction (pH).

7.2.1 *Sampling*—A representative sample should be taken from each field. Using a soil sampling tube, pull out about 50 random samples per acre of turf, and combine them to obtain a representative sample. Samples should be taken from the soil surface to a depth of 51 to 102 mm (2 to 4 in.).

7.2.2 Remove the thatch and any stones or debris.

7.2.3 Thoroughly mix the cores and pull a one pint 0.5 L (1 pt) sample from the composite to submit to the testing lab.

7.2.4 Provide as much information to the lab as possible, including the use of the area, grass species, past fertilization history, irrigation or not, clipping removal or not, age of the field, and other information the lab may request.

7.2.5 Submit the samples to a state or commercial soil testing lab. Maintain records of samples submitted, to include sampling date, soil testing lab, and results.

7.3 *Soil Reaction (pH)*—Ideally, soil pH should be maintained in a range of 6.0 to 7.0, although acceptable turf can be maintained outside this range with careful management of plant nutrients.

7.3.1 Lime should be applied as per soil test recommendations to increase soil pH. Lime materials may include pulverized or granular limestone, pelletized limestone, and hydrated lime. Use dolomitic liming materials if there is a need for