



Designation: F3640 – 23

Standard Test Method for Full Depth Field Sampling of In-situ Synthetic Turf Infill Materials¹

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1. Scope

1.1 This test method provides a consistent sampling procedure for obtaining infill samples of synthetic turf infill materials in the field.

1.2 Operational considerations include:

1.2.1 This method requires that attic stock infill materials or infill materials from areas that are out-of-play be available for refilling holes left by the sampling procedure. Replacement of infill materials shall match the composition of the material removed.

1.2.2 Using this method to determine the in-situ weight and density will result in unreliable data due to the inclusion of moisture within the infill materials. Proper laboratory procedure including wet weight, dry weight before separation, and component weight after separation ensure no loss, and reliable data.

1.3 Evaluation and analysis of the samples in the field and or laboratory are not covered herein.

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

1.5 *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.*

1.6 *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.*

¹ This test method is under the jurisdiction of ASTM Committee F08 on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee F08.65 on Artificial Turf Surfaces and Systems.

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2. Referenced Documents

2.1 *ASTM Standards:*²

C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates

D5644 Test Method for Rubber Compounding Materials—Determination of Particle Size Distribution of Recycled Vulcanizate Particulate Rubber

F1632 Test Method for Particle Size Analysis and Sand Shape Grading of Golf Course Putting Green and Sports Field Rootzone Mixes

F1936 Specification for Impact Attenuation of Turf Playing Systems as Measured in the Field

3. Terminology

3.1 *Definitions:*

3.1.1 *attic stock infill, n*—a reserve supply of the original infill material suitable for filling holes resulting from sampling.

3.1.2 *cleaning brush, n*—a suitable brush, similar to a small paint brush that would be used for brushing of infill materials that are adhered to the wall of the collection container into the sample container.

3.1.3 *dimension ties, n*—measurements from fixed field event marking points to the sample area. Dimension ties shall be provided where precise locations are considered critical.

3.1.4 *duplicate samples, n*—multiple samples taken from a sample area in cases where an undisturbed sample or samples are required.

3.1.5 *infill depth gauge, n*—the infill depth gauge shall be suitable for measuring depths of the infill being sampled.

3.1.6 *sample, n*—the infill material contained within the walls of the sampling tube down to the top of the turf backing system.

3.1.7 *sample area, n*—a square meter area from which a sample or samples are taken. Where multiple samples are taken from a sample area they shall be no more than 0.5 m (1.64 ft) apart.

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.

3.1.8 *sample area site plan (map), n*—depicts the location of the individual Sample Areas within a site that are included in the sampling program. It shall provide adequate detail for the Map to be oriented with field conditions. This shall be included in the final report.

3.1.9 *sample containers, n*—sealable bags or other suitable sealable, moisture proof containers of adequate size to contain the full sample size.

3.1.10 *sample infill depth, n*—the average of three infill depths measured within the sample tube.

3.1.11 *sample loosening device, n*—shall be a rounded edge metal spoon, rounded edge screwdriver, a large metal spike, or other small digging device without sharp edges, sized to fit within the matrix of the fibers.

3.1.12 *sampling program, n*—shall outline the issue(s) of concern, purpose(s), and goals of the sampling effort.

3.1.13 *sampling site, n*—the locus, location, site, or a field from which multiple samples are taken.

3.1.14 *sampling tube, n*—a sample area containment vessel that shall consist of a round pipe shape tube with a handle used to allow a full-depth infill sample to be obtained in the field, wall to wall of the sampling tube.

3.1.15 *sampling vacuum, n*—a portable vacuum with a collection receptacle capable of containing removed infill materials.

4. Summary of Sampling Method

4.1 Prior to undertaking a Sampling Program an evaluation of the Sampling Site should be made to identify potential Sample Areas. A Sample Area Site Plan shall be prepared to depict Sample Areas which shall each have a Sample Area Number.

4.1.1 The number of samples and Sample Area locations shall be specific to the underlying purpose of the Sampling Program.

4.1.2 The range of infill depths on a Sampling Site shall be determined before sampling in order to assure that the Sample Areas are representative of the intended sample conditions being evaluated. To assure this an infill depth evaluation shall be performed in support of the sampling program.

NOTE 1—As an example, having a measured infill depth range over the full Sampling Site allows total infill material volume and mass to be calculated.

4.2 Samples shall be taken using the sampling tube with critical data such as sample area number and infill depth recorded on the final report.

4.3 Samples shall be placed in sealable bags or containers to maintain moisture content of the sample.

5. Significance and Use

5.1 Currently methods of infill sampling procedures differ from vendor to vendor and from technical agent to technical agent. Providing a uniform procedure for sampling, which allows for a consistent vertical sample, will allow for more consistent and accurate evaluation/measurement in the laboratory of samples taken in the field.

5.2 The Sampling Program and associated Sample Area Site Plan (Map) shall take into account the specific purpose or purposes of the testing and determine appropriate sample areas based on needs and field conditions. A partial list of possible purposes include:

5.2.1 General overall field evaluation of the infill material density, overall application rate, total quantities, and infill variation across the field area.

5.2.2 Infill component composition and variation/uniformity as it relates to infill material weights and ratios. This can identify inconsistencies in construction techniques and quality control.

5.2.3 Infill material evaluation for injury related surface assessment.

5.2.4 Infill material end of life and potential reuse assessment.

5.2.5 Field area contamination assessment.

5.3 Laboratory testing that may be performed on obtained samples include but are not limited to:

5.3.1 Test Method **C136**.

5.3.2 Test Method **D5644**.

5.3.3 Test Method **F1632**.

6. Interferences

6.1 Sampling during frozen conditions and extremely wet conditions is not recommended.

6.2 Sampling of damaged or contaminated areas, or both, where damaged or contaminated conditions, or both, are not the subject of the Sampling Program are likely to result in inaccurate data and shall be avoided.

6.3 When sampling of damaged and or contaminated infill material is part of the assessment, a mix of damaged or contaminated and non-damaged or non-contaminated conditions shall be evaluated for comparison purposes.

6.4 Poorly cleaned vacuum hoses, wands, and collection receptacle are likely to result in inaccurate data.

7. Apparatus

7.1 Sampling Tube:

7.1.1 The sampling tube shall be a round pipe shape device used to allow a full-depth infill sample to be obtained in the field with the sample being removed from inside edge to edge of the sampling tube wall. It shall be durable enough to not deform from use or transportation. It is suggested that the material be plastic or metal. (See Fig. 1.)

7.1.1.1 The top and bottom open edges of the tube shall not be sharp. It is suggested that the bottom edge be crimped in the manner of a metal stove pipe reducer to allow the edge to gently loosen the infill material as the tube is pressed down and twisted to the backing system. The thickness of the tube walls shall be between 0.7 mm in thickness to 1.0 mm (22 gauge to 20 gauge). Thicker tubes have a tendency to prevent the tube from entering the infill material without disrupting the sample by causing displacement of infill material, or both. A handle shall be attached to the top of the sampler to facilitate full insertion the tube to the top surface of the backing.

NOTE 2—An example of a sampling tube is a 180 mm in diameter to