Designation: F 1551 – 03

An American National Standard

Standard Test Methods for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials[1]

This standard is issued under the fixed designation F 1551; 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 These test methods establish a recommended list of test methods to be used for the identification of physical property characteristics and comparison of the performance properties of synthetic turf systems or components for athletic and recreational uses, or both.

1.2 The test procedures included in these test methods apply as a group to the description of synthetic turf playing surfaces.

1.3 Some of the test procedures are specific for components of the synthetic turf system, and others apply to the complete synthetic turf playing surface.

1.4 Some of the test procedures are suitable only for the laboratory characterization of either components or the complete system; others are suitable for tests on installed sports fields; and some tests may be applied in both the laboratory and the field.

1.5 Reference to the methods for testing the synthetic turf playing surface and its components contained herein should state specifically the particular test or tests desired and not necessarily refer to these test methods as a whole.

1.6 This is a physical property characterization standard, and it shall not be construed as a safety standard.

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

1.8 *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 limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

2.1.1 *Pile Fiber:*

D 789 Test Methods for Determination of Relative Viscosity and Moisture Content of Polyamide (PA)

D 792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

D 1577 Test Methods for Linear Density of Textile Fibers

D 2256 Test Method for Tensile Properties of Yarns by the Single-Strand Method

2.1.2 *Fabric:*

D 418 Methods of Testing Pile Yarn Floor Covering Construction[3]

D 1335 Test Method for Tuft Bind of Pile Yarn Floor Coverings

D 1682 Test Methods for Breaking Load and Elongation of Textile Fabrics[3]

D 1776 Practice for Conditioning and Testing Textiles

D 2859 Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials

D 4158 Guide for Abrasion Resistance of Textile Fabrics (Uniform Abrasion)

D 5251 Practice for the Operation of the Tetrapod Walker Drum Tester

E 648 Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

F 1015 Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces

2.1.3 *Shock Absorbing Cushion Underlayment:*

D 395 Test Methods for Rubber Property—Compression Set

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D 624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

D 1667 Specification for Flexible Cellular Materials—Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)

D 1876 Test Method for Peel Resistance of Adhesives (T-Peel Test)

D 2126 Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging

D 3574 Test Methods for Flexible Cellular Materials—Slab,

[1] These test methods are under the jurisdiction of ASTM Committee F08 on Sports Equipment and Facilities and are the direct responsibility of Subcommittee F08.65 on Artificial Turf Surfaces and Systems.

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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] Withdrawn.

Bonded, and Molded Urethane Foams
D 3575 Test Methods for Flexible Cellular Materials Made From Olefin Polymers
D 3936 Test Method for Resistance to the Delamination of Secondary Backing of Pile Yarn Floor Covering
F 355 Test Method for Shock-Absorbing Properties of Playing Surface Systems and Materials
2.1.4 *Turf Systems:*
D 1667 Specification for Flexible Cellular Materials—Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)
F 355 Test Method for Shock-Absorbing Properties of Playing Surface Systems and Materials
F 1015 Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces
F 1936 Specification for Shock-Absorbing Properties of North American Football Field Playing Systems as Measured in the Field
2.2 *Other Standards:*
2.2.1 *Turf Systems:*
AT 030 Sports Shoe Traction
DIN 18-035 Part 6—Water Permeability of Synthetic Turf Systems and Permeable Bases

NOTE 1—AstroTurf® Industries internal test procedures are suitable as bases for new ASTM test methods as follows: (*1*) Water Permeability of Synthetic Turf (DIN 18-035, Part 6); and (*2*) Ball Bounce and Ball Rebound.

3. Terminology

3.1 *Definitions*—Terms are as defined in the referenced ASTM procedures comprising these test methods.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *fabric construction*—the method of assembly of pile ribbon and backing yarns that produces the fabric, usually tufting, knitting, or weaving.

3.2.2 *lengthwise direction*, *n—in textiles*, the direction in a machine-made fabric parallel to the direction of movement the fabric followed in the manufacturing machine.

3.2.3 *matting*—the extent of change of the apparent synthetic turf pile thickness from the original value due to permanent compression of the pile from sports use.

3.2.4 *pile*, *n—for pile ribbon turf surfacing*, the texture surface composed of many tuft legs bound to backing fabric in an orderly and repetitive array.

3.2.5 *pile lay*—the direction in which most of the pile fibers lean in the original, uncrushed fabric.

3.2.6 *secondary backing*—a material adhered to the backing side of a pile turf fabric.

3.2.7 *sports shoe traction*—a measure of the static or sliding coefficient of friction between a weighted sports shoe and the turf pile surface, horizontal motion.

3.2.8 *sports shoe traction differential*—a measure of difference in sports shoe traction in two or more directions along the turf pile surface.

3.2.9 *synthetic turf system*—(all except bases and subbases) includes turf fabric, with attached or detached under cushion.

3.2.10 *synthetic turf system components*—the separate components such as turf fabric, shock-absorbing pad, and adhesives that comprise the synthetic turf playing surface when assembled; the subcomponents such as pile ribbon and backing yarns that comprise the turf fabric.

3.2.11 *texture*—the detailed configuration of loops, cut pile ends, and individual fibers in the pile layer.

3.2.11.1 *Discussion*—Texture is the detailed appearance of the pile that changes by matting, crushing, flattening, fuzzing, untwisting, etc. during exposure to service. The texture should be distinguished from the construction, that is, the specifications of kinds of yarns, yarn sizes, and the mode of combination.

3.2.12 *water permeability*—the rate at which water of a specified head flows vertically through synthetic turf or other components of the system.

4. Summary of Test Methods

4.1 The purpose of these test methods is to provide a comprehensive characterization of synthetic turf playing surfaces through reference to existing ASTM procedures.

4.2 Specific conditions of the referenced ASTM procedures are recommended to encourage uniform application of these test methods.

4.3 Table 1 contains a list of all the assigned suffix letters that may be used for describing the system and components of these test methods.

5. Significance and Use

5.1 These test methods constitute a standard for obtaining data in research and development, quality control, acceptance and rejection under specifications, and for special purposes.

5.2 The data obtained from use of these test methods are applicable to the system and its components under conditions of the particular test procedures and are not necessarily the same as the data that might be obtained in other environments or use conditions.

5.3 The selection of test methods or tests should be limited to those necessary to achieve design of the system.

6. Conditioning of Materials

6.1 Conduct laboratory tests under known conditions of temperature and humidity as specified in the individual test procedures. In the absence of specified conditions, tests must be conducted under the standard laboratory conditions of 23 ± 2°C (73.4 ± 3°F) and 65 ± 5 % relative humidity. Materials must be conditioned, undeflected, and undistorted at the temperature and humidity of test for at least 24 h prior to testing.

6.2 Conduct field tests on installed, indoor or outdoor synthetic turf playing surfaces at ambient temperature and humidity conditions. Measure and record the temperature of the synthetic turf surface, shock-absorbing pad, or other specific components being characterized by the particular test.

7. Sampling

7.1 For laboratory tests, select representative samples of components, in accordance with specific sampling instructions of the test procedure, when provided.

7.2 For field tests, specify locations on the synthetic turf playing surface where tests are conducted.

TABLE 1 Suffix Letter Designations: Performance Test Methods for Synthetic Turf Surfaces

ASTM Test Method	Test Method Suffix	Pile Fiber	Section
D 789		melting point	9
D 792		density (specific gravity)	10
D 1577	A	linear density of textile fibers (denier)	11
D 2256	A-1	breaking strength and elongation	12
		Fabric	
D 418		pile fiber construction	13
D 418		pile height	13
D 1335		resistance to tuft pullout	14
D 1682	G-T	grab tear strength	15
D 4158		abrasion resistance (uniform abrasion method)	16
D 2859		flammability of pile floor covering (methenamine tablet test)	17
E 648		flammability of synthetic turf (flooring radiant panel test)	18
F 1015		relative abrasiveness of synthetic turf surfaces	19
D 5251		resistance to matting (tetrapod method)	32
		Shock Absorbing Pad Component	
D 395	compression set under constant load	20	
D 624	Die C	tear resistance	21
D 1667	D	compression resistance	22
D 1876		T-peel strength of secondary pad	23
D 2126		hydrolytic stability	24
D 3574	E	tensile and elongation	25
D 3936		delamination strength of secondary backing	26
F 355		shock absorbency of playing surface systems and materials	27
D 3575	L	water absorption (% weight gain)	28
		Turf Systems	
F 1015		relative abrasiveness of synthetic turf surfaces	19
D 1667	D	compression resistance (modified method)	22
F 1936	A	shock absorbency of playing surface systems in the field	27
F 355		shock absorbency of playing surface systems and materials	28
MTP-0030		sports shoe traction and traction differential (coefficient of friction)	30
DIN 18-035		water permeability of synthetic turf system	31
		ball bounce—ball rebound	32

8. Application of Test Procedures

8.1 References to the ASTM test procedures stated in Section 9 are to be followed with regard to the apparatus, preparation of specimens, procedures, calculations, and reporting of results, except when different conditions are noted specifically in these test methods.

8.2 Precision and bias statements are given for each test procedure in the respective test methods.

8.3 Specific conditions of the referenced ASTM test procedures are recommended in each case, except where specified in these test methods.

TEST PROCEDURES

9. Suffix A—Test Methods D 789, Determination of Relative Viscosity, Melting Point, and Moisture Content of Polyamide (PA)

9.1 *Scope*:

9.1.1 These test methods describe several techniques for the characterization of polyamides, polypropylene, and other fibers.

9.1.2 The applicable part of this test procedure is that describing the measurement of melting point for polyamide fibers and other fibers used in constructing synthetic turf fabrics.

9.2 *Test Method Specific Conditions*:

9.2.1 A temperature rise of 2°C/min with the Fisher-Johns melting point apparatus is recommended.

9.2.2 Acceptable alternatives for the measurement of melting point are the use of differential thermal analysis (DTA) or differential scanning calorimetry (DSC) instruments. Follow Test Methods D 789 where applicable. Report the temperature rise and other pertinent experimental conditions used with DTA or DSC.

10. Suffix W—Test Method 792, Specific Gravity (Relative Density) and Density of Plastics by Displacement

10.1 *Scope*:

10.1.1 This test procedure describes measurement of the specific gravity of fibers and filaments.

10.1.2 This test is appropriate and applicable to the pile ribbon component of synthetic turf fabrics before the product is made.

11. Suffix W—Test Methods D 1577, Linear Density of Textile Fibers

11.1 *Scope*:

11.1.1 This test procedure describes measurement of the linear density (denier, tex) of textile fibers and filaments.

11.1.2 The test is appropriate and applicable to the pile ribbon component of synthetic turf fabrics before the product is made.

11.2 *Test Method Specific Conditions*:

11.2.1 *Test Method A*—The direct weighing method is recommended.

11.2.2 The linear density of finish-free fiber is the recommended measurement; see 12.1 of Test Methods D 1577.

12. Suffix T—Test Method D 2256, Tensile Properties of Yarns by the Single-Strand Method

12.1 *Scope*:

12.1.1 This test procedure describes measurement of the tensile properties strength, elongation, and (optionally) modulus for textile fibers and filaments.

12.1.2 The test is appropriate and applicable to the pile ribbon component of synthetic turf fabrics before the product is made.

12.2 *Test Method Specific Conditions*:

12.2.1 Option A1, standard-conditioned, straight fiber or filament is recommended.

12.2.2 Horn grip clamps are recommended.

12.2.3 The recommended gage length is 15.2 cm (6 in.).

12.2.4 The recommended cross-head speed is 25.4 cm/min (10 in./min).

12.2.5 The tangent method is recommended if the modulus is calculated (Appendix, Test Method D 2256).

12.2.6 The measurement of strength and elongation may be conducted on monofilaments or multifilament yarns; specify which.

13. Methods D 418, Testing Pile Yarn Floor Covering Construction

13.1 *Scope*:

13.1.1 The test methods are designed for the characterization of pile materials such as carpets.

13.1.2 This test procedure describes several methods appropriate and applicable for characterizing synthetic turf fabrics by pile thickness, tuft height (blade length), and suitable measurements of fabric weight.

13.1.3 Some of the test procedures, such as tuft height (blade length), are applicable in the field as well as in the laboratory.

13.2 *Test Method Specific Conditions*:

13.2.1 The normally applicable tests of the group are as follows: total mass per unit area (Section 7 of Methods D 418); component masses per unit area (Section 8); pile yarn mass per unit area (Section 9); pile thickness—level pile (Section 10); and tuft height (blade length) (Section 13).

13.2.2 Tests of the group normally not applicable for synthetic turf playing surfaces are as follows: number of bonding sites per unit length (Section 16 of Methods D 418); and tuft length for level loop pile floor covering (Section 15).

14. Suffix T—Test Method D 1335, Tuft Bind of Pile Floor Coverings

14.1 *Scope*:

14.1.1 This test provides a method for measuring the tuft bind in pile fabrics such as carpets.

14.1.2 The test is appropriate and applicable to the pile ribbon component of synthetic turf fabrics.

14.2 *Test Method Specific Conditions*:

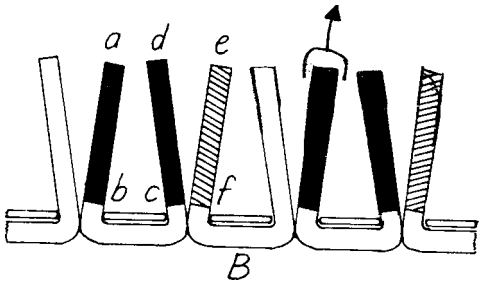
14.2.1 Test Method D 1335 is written in the language of fabrics of tufted construction. However, application may be extended to knitted and woven synthetic turf fabrics if the concept of tuft is redefined suitably.

14.2.2 *Tufted Fabrics*—For the purposes of Test Method D 1335, a tuft has the conventional definition of the two halves of the mono- or multifilament loop of pile that is inserted between the adjacent yarns of the tufting medium (backing fabric), held in place by a primary coating (adhesive), and not otherwise connected mechanically to the tufting medium (see Fig. 1).

14.2.3 *Knitted Fabrics*—For the purposes of Test Method D 1335, a tuft is comprised of the adjacent legs of two loops of pile. Each loop passes under a yarn of fabric backing, but adjacent legs are not restrained mechanically, thereby permitting pullout without rupture of the backing yarns (see Fig. 2).

14.2.4 *Woven Fabrics*—For the purposes of Test Method D 1335, a tuft is defined suitably as in the case of knitted fabrics (14.2.3) to avoid rupture of the backing yarns when determining tuft pullout (see Fig. 3).

14.3 The specified cross-head speed for the measurement of tuft bind with all fabrics is 30.5 ± 1.0 cm/min (12 ± 0.05 in./min).



ad	= cut pile tuft element
ab, cd, ef	= tuft legs
cd, ef	= cut pile tuft leg pair
B	= one bonding site

FIG. 1 Cross Section of Tufted Pile

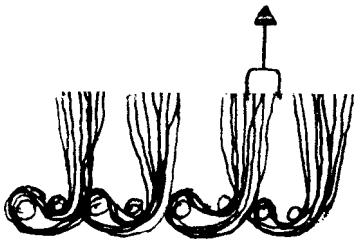


FIG. 2 Cross Section of Knitted Pile

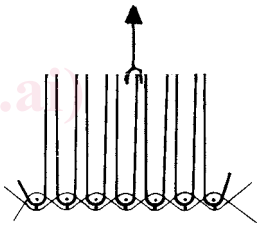


FIG. 3 Cross Section of Woven Pile

15. Suffix T—Test Methods D 1682, Breaking Load and Elongation of Textile Fabrics

15.1 *Scope*:

15.1.1 This test provides methods for determining the breaking strength and elongation of textile fabrics.

15.1.2 Of the various test methods described in Test Methods 1682 for measuring the strength of textile materials, the grab test (Section 16) is recommended for use with synthetic turf fabrics.

15.2 *Test Method Specific Conditions*:

15.2.1 The recommended instrument type for the tensile testing is a constant rate of extension (CRE) tensile testing machine.

15.2.2 The recommended sample size is 10.2 by 15.2 cm (4 by 6 in.). The sample elongation is in the longer dimension.

15.2.3 The recommended clamps (top and bottom) are 2.54 by 2.54 cm (1 by 1 in.) on one side and 2.54 by 5.08 cm (1 by 2 in.) on the other side. The shorter side of the clamp is oriented in the direction of sample elongation.

15.2.4 The recommended gage length is 7.6 cm (3 in.).

15.2.5 The recommended cross-head speed is a uniform 30.5 cm/min (12 in./min).

15.2.6 The test method is applicable to knitted fabrics. (**Warning—**Higher strengths and elongation than anticipated could result.)

16. Suffix J—Test Method D 4158, Abrasion Resistance of Textile Fabrics (Uniform Abrasion Method)

16.1 *Scope*:

16.1.1 This test describes the Schiefer and Krasny method for determining the resistance of fabrics to abrasion.

16.1.2 The test is useful for characterizing the abrasion resistance of synthetic turf fabrics.

16.2 *Test Method Specific Conditions*:

16.2.1 The type of abradant wheel used must be specified when reporting the results.

16.2.2 The spring steel blade abradant is the recommended standard.

16.2.3 The counterweight used must be specified when reporting the results.

16.2.4 The 4.536-kg (10-lb) counterweight is the recommended standard.

16.2.5 The standard abrading wheel r/min is 260.

17. Suffix Test Method D 2859, Flammability of Finished Textile Floor Covering Materials

17.1 *Scope*:

17.1.1 This test covers determination of the flammability of finished textile floor covering materials using the methenamine tablet method.

17.1.2 This test method should be used for measuring and describing the properties of materials or assemblies in response to heat and flame under controlled laboratory conditions. It should not be used for describing or appraising the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions.

17.2 *Test Method Specific Conditions*:

17.2.1 This test method involves the exposure of conditioned and oven-dried samples to a methenamine tablet ignition source in a draft-protected environment and measurement of the resulting char length.

17.2.2 The test method may be used for assessing the effect of a specific underlay or cushion in combination with a floor covering.

17.2.3 Condition the samples as directed in Practice D 1776.

17.3 *Sampling and Test Specimens*:

17.3.1 Cut eight specimens from each lot fabricated for each playing surface or field.

17.3.2 This test is applicable for new, non-used, synthetic turf surfaces and materials.

17.4 *Procedure, Results, and Report*—Test Method D 2859 applies as written for synthetic turf fabrics and surfaces.

18. Suffix M—Test Method E 648, Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source

18.1 *Scope*:

18.1.1 This test describes the apparatus and technique for determining the critical radiant flux (CRF), a measure of the flammability resistance of fabrics using the flooring radiant panel method.

18.1.2 The test is applicable to synthetic turf fabrics.

18.2 *Test Method Specific Conditions*:

18.2.1 The test method applies as written to synthetic turf fabrics.

18.2.2 The results for CRF will differ, depending on whether the fabric tested also has its shock-absorbing pad placed under it during the test.

NOTE 2—Test Method E 648 is applicable to floor-covering system specimens that follow or simulate accepted installation practices. Tests on the individual elements of a floor system are of limited value and are not valid for evaluation of the flooring system.

18.2.3 Run tests with and without the undercushion, and report the results of both tests.

19. Test Method F 1015, Relative Abrasiveness of Synthetic Turf Playing Surfaces

19.1 *Scope*:

19.1.1 This test was designed specifically for use with synthetic turf fabrics.

19.1.2 This test is applicable to both laboratory and field measurement.

19.1.3 The test also may have use for natural grass playing surfaces.

19.2 *Test Method Specific Conditions*—The test method applies as written to synthetic turf fabrics and surfaces.

20. Suffix B—Test Methods D 395, Rubber Property—Compression Set

20.1 *Scope*:

20.1.1 This test method covers the testing of shock-absorbing pad components intended for use in applications in which the pad will be subjected to compressive stresses in air or liquid media.

20.1.2 This test is appropriate and applicable to the shock-absorbing pad component of synthetic turf playing surfaces.

20.2 *Test Method Specific Conditions*:

20.2.1 *Test Method A*—Compression set under constant force in air is to be used.

20.2.2 The test specimens are to be 5.08 by 5.08 cm (2 by 2 in.) by gage of the cushion underlayment to be used.

20.2.3 The compression load is to be 1.8 kN (400 lb or 100 psi) for 22 h.

20.2.4 The compression set is calculated after 24 h recovery.

21. Suffix G—Test Method D 624, Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer

21.1 *Scope*:

21.1.1 This test describes a characterization of rubber or foam samples by tear resistance.

21.1.2 The test applies to the shock-absorbing pad component of synthetic turf playing surfaces.

21.2 *Test Method Specific Conditions*:

21.2.1 The sample is an unnicked, 90° angle specimen cut with ASTM Die C.

21.2.2 The specified cross-head speed is 50.8 cm/min (20 in./min).

22. Suffix D—Specification D 1667, Flexible Cellular Materials—Vinyl Chloride Polymers and Copolymers (Closed-Cell Vinyl)

22.1 *Scope*:

22.1.1 This specification applies to the shock-absorbing pad component.

22.1.2 This test consists of measuring the force necessary to produce a 25 % deflection on a round 6.45-cm^2(1-$in.^2$) test specimen.

22.1.3 This test method is recommended for polyvinyl chloride (PVC) foams or copolymer thereof, polyolefin foams, and other pads.

22.2 *Test Method Specific Conditions*:

22.2.1 Test to Specification D 1667 Suffix D (compression deflection test) with the following deviations:

22.2.2 *Compression Force Deflection Test (CFD)*—A round 2.87-cm (1.129-in. diameter) sample is prepared using a rotary die cutter. Use an ASTM D75 – 83 cutting tool (1.129 in. diameter) for the drill press.[4] Use a flat compression foot that is larger than the specimen to compress the sample. Cut three specimens for testing and averaging the results.

22.2.3 *Indention Force Deflection Test (IFD)*—This test method is required for uneven surfaced pads, that is, convoluted, etc., where a 6.4515-cm^2 (1.0-$in.^2$) specimen is not representative of the sample.

22.2.3.1 Cut a 25.4-cm^2 (10-$in.^2$) specimen. Use a 15.24-cm (6-in.) diameter compression foot plate, which is smaller than the specimen, to compress the sample.

22.2.4 Using a CRE (compression) instrument, deflect the specimen 25 % of its original height. (The specimen gage will be 75 % of its original gage at 25 % deflection.)

22.2.5 Record the force on a strip chart, and read the force from the chart at 25 % deflection, or record the value if the machine compresses the specimen 25 % automatically and provides the value. This is an immediate reading, not a 60 s hold and read value.

22.2.6 The cross-head speed is to be 5.1 cm/min (2.0 in./min).

22.2.7 The test specimen gage is the shock-absorbing pad component gage used in the final product. Measure the pad thickness as described in Section 15 of Specification D 1667.

22.3 *Calculation*:

$$CFD \text{ at } 25\ \% = \text{report force direct as determined in } 22.2.2 \quad (1)$$

$$IFD \text{ at } 25\ \% = \frac{\text{total force required at 25 \% compression deflection}}{28.26} \quad (2)$$

where:

28.26 = $in.^2$ of specimen compressed under the 6-in. diameter compression foot plate.

22.4 *Report*:

22.4.1 Report the following data:

22.4.1.1 Average unit force required, expressed in kPa or psi.

22.4.1.2 CFD at 25 % or IFD at 25 %, depending on the method used.

22.4.1.3 Diameter of the compression foot used.

22.4.1.4 Compression or cross-head speed.

22.4.1.5 Sample temperature at the time of testing.

23. Suffix K—Test Method D 1876, Peel Resistance of Abrasives (T-Peel Test)

23.1 *Scope*:

23.1.1 This test is designed for determination of the peel resistance of adhesive bonds, primarily between flexible adherents, by means of a T-type specimen.

23.1.2 The applicability to synthetic turf playing surfaces primarily is to characterize the adhesive bond between the turf component and the (adhesively attached) shock-absorbing pad component.

23.2 *Test Method Specific Conditions*:

23.2.1 Section 4.2 of Test Method D 1876 is modified to accommodate 5.08-cm (2-in.) wide test specimens instead of 2.54-cm (1-in.) wide specimens.

23.2.2 Section 5 of Test Method D 1876 may be modified to shorter periods of specimen conditioning. (Specify the periods used.)

23.2.3 The recommended cross-head speed is 30.5 cm/min (12 in./min).

24. Suffix S—Test Method D 2126, Response of Rigid Cellular Plastics to Thermal and Humid Aging

24.1 *Scope*:

24.1.1 This series of tests specifies procedures for measuring the effect of various combinations of temperature and relative humidity on specimen physical dimensions.

24.1.2 This test is used to determine aging effects on the shock-absorbing pad component for the purposes of characterizing synthetic turf playing surfaces.

24.1.3 The test applied to the shock-absorbing pad components is also extended to include nonrigid as well as rigid cellular plastics that may be used in their construction.

24.2 *Test Method Specific Conditions*—Test Method D 2126, 70°C (158°F) at 97 % relative humidity, is recommended for the shock-absorbing pad component of synthetic turf playing surfaces.

25. Methods D 3574, Testing Flexible Cellular Materials—Slab, Bonded, and Molded Urethane Foams

25.1 *Scope*:

25.1.1 This test describes a series of material characterizations selected particularly for polyurethane foams.

25.1.2 When applicable to synthetic turf playing surfaces, the test will be applied to the shock-absorbing pad component made from polyurethane or other foams.

25.1.3 Of particular interest among the test methods listed is that for tension, Test E—Tension Test, Section 45 of Methods D 3574.

[4] Available from NAEF Press & Dies, Inc., Bolton Landing, NY 12814.