

STMA 29th Conference

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"Designer" Perspective

- Architect, Landscape Architect, or Engineer
 - May be Contracted by the Owner
 - May be on a team with Contractor in Design-Build
 - Most often professionally licensed

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- Role of Designer
 - Preparation of Project Documents
 - Construction Drawings
 - Project Manual
 - Front End Specs
 - Technical Specs
 - Ensure Program Meets Owner Objectives
 - Ensure End Product
 - Public Health Safety and Welfare
 - Permits
 - Budget

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- Construction Specifications Institute (CSI)
- MasterFormat
 - 6 Digit System (01 30 00)
 - First 2 digits denote primary section.
 - There are 48 primary sections. For example Concrete is 03 00 00
 - Second 2 digits denote main headings and sub headings.
 - For example Concrete Reinforcing is 03 20 00
 - Or Reinforcing Bars is 03 21 00
 - Final 2 digits allow more breakdown.
 - For example Plain Steel Reinforcement Bars is 03 21 11

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- Front End Specs
 - Division 00 – Procurement & Contracting

• Legal Notice	• Owner – Contractor Agreement
• Instructions to Bidders	• General Conditions
• Qualifications Statement	• Bid Guaranty
• Bid Form	• Lien Waiver & Release Forms
 - Division 01 – General Requirements

• Summary Of Work	• Temporary Facilities
• Alternates	• Cutting & Patching
• Payment Procedures	• Closeout Procedures
• Submittal Procedures	• Record Documents

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- Technical Specs
 - Athletic Equipment
 - Playground Equipment
 - Site Furnishings
 - Earthwork
 - Concrete Paving
 - Synthetic Turf
 - Irrigation
 - Soil Preparation
 - Turfs & Grasses

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- Prescriptive (Product) Spec
 - Detailed Material & Installation
 - Three Sections
 - General
 - Items such as Standards, Quality Control, and Warranty
 - Products
 - Listing of products, and requirements of products
 - Execution
 - How to prepare materials & conduct installation
 - Testing Requirements

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- Performance Spec
 - Specifies the operational requirements of component
 - What the final installed product must be capable of doing
 - How the component must function after installation
 - Focuses on the outcome
 - Contractor often required to test final product to ensure it is operating properly
 - Allows for more innovation and flexibility

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- Substitution Request
 - New product not listed in specs
 - For A/E or Owner approval
- Submittals
 - Product the contractor intends on using
 - For Example, cut sheet for soccer goal
 - For A/E approval
- Shop Drawings
 - Field Graphics, Seaming Plan

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- Natural Grass
 - Product Spec Examples
 - 6" Topsoil, PH Range
 - 10% Secretariat Perennial Ryegrass
 - Fertilizer at 4 lbs / 1000 sf
 - Testing for Soil Texture, Bulk Density, Water Retention
 - Performance Spec
 - USGA

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- Synthetic Turf
 - Product Spec
 - ABC fiber
 - XYZ Infill
 - Specified Pile Height
 - Specified Grab Tear Strength of Backing
 - Must Provide in-situ G-Max Testing
 - Performance Spec
 - Must be FIFA Quality
 - Must be tested per FIFA Guidelines

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STMA 29th Conference Contractor Perspective

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Division III NESCAC Conference School

- "Never buy based on a Salesman or Vendor Presentation"





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Ivy League School

- Natural Grass Qualifications, Experience & Grow-In Responsibility







TYPES OF SPECIFICATION




Performance





Prescriptive



Proprietary



Standardized Specifications

PERFORMANCE SPECIFICATION





PRESCRIPTIVE SPECIFICATION





PROPRIETARY SPECIFICATION





STANDARDIZED GUIDES & SPECIFICATIONS



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TESTING & PARAMETERS



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ASTM INTERNATIONAL



- ASTM International is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.



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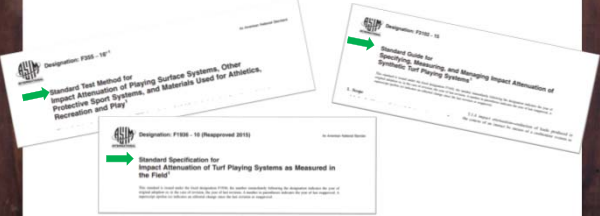
OTHER STANDARDS ORGANIZATIONS




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TYPES OF DOCUMENTS



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CERTIFICATIONS, MANUALS, & GUIDELINES




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APPLICABLE SURFACES


Artificial Turf




Natural Turf




BASES




WALL PADDING




RUNNING TRACK




INDOOR FLOORING





PLAYGROUND




FLOOR PADDING




BY TYPE OR PROJECT PHASE



testing toolbox



or

testing toolbox



TYPES OF TESTING

Purpose of Testing

- Material Identification
- Assessment / Certification
- Forensic Investigation

Ball Interaction

- Vertical Ball Rebound
- Ball Roll Distance
- Angle Ball Rebound
- Infill Splash

Player Interaction

- Artificial Athlete Tests
- Force Reduction
- Vertical Deformation
- Energy Restitution
- Rotational Resistance
- Linear Friction Slid
- Surface Abrasion

Base Construction

- Base Drainage Testing
- Base Planarity Evaluation
- Compaction Testing
- Slope Evaluation


Surfaces Tested



- Synthetic & Natural Turf
- Indoor Sports Flooring
- Playground Surfacing
- Running Tracks & Tennis Courts
- Wrestling & Martial Arts Mats
- Climbing & Gymnastic Mats
- Wall & Equipment Padding

Impact Safety

- Synthetic Turf Impact g-max
- Clegg Hammer Impact (natural only)
- Hemisphere Turf Impact (EN 1177)
- Playground Impact g-max
- Wrestling Mat Impact g-max


testing toolbox




SURFACE QUALITIES







Surface Qualities

- Surface Durability Testing
- Temperature Evaluation
- Surface Drainage Testing
- Line Marking Verification
- Surface Planarity Evaluation




MATERIAL PROPERTIES










Material Properties

- Turf Identification
- Weight, Size and Shape
- Chemical Composition
- UV & Artificial Weathering
- Heavy Metal Toxicology Analysis
- Seam & Surface Loading Strength




IMPACT SAFETY








Impact Safety

- Synthetic Turf Impact g-max
- Clegg Hammer Impact (natural only)
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PLAYER INTERACTION

Player Interaction
Artificial Athlete Tests
Force Reduction
Vertical Deformation
Energy Restitution
Rotational Resistance
Linear Friction Skid
Surface Abrasion

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BALL INTERACTION

Ball Interaction
Vertical Ball Rebound
Ball Roll Distance
Angle Ball Rebound
Infill Splash

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BASE CONSTRUCTION

Base Construction
Base Drainage Testing
Base Planarity Evaluation
Compaction Testing
Slope Evaluation
3-D Surface Scan

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PROJECT PHASES

Project Inception
Base Construction
Materials
Turf Installation
Monitoring / Warranty
End-of-life

testing toolbox

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REVIEW 2015 CERTIFIED FIELD TESTS WHICH FAILED :

110 FIELDS TESTED
53 FAILED

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PRODUCT DECLARATION & LAB TESTING

LABORATORY TESTING REQUIREMENTS / PRODUCT DECLARATION:
The following testing is required to be performed by an independent laboratory on the proposed synthetic turf system (infill, turf, and underlayment if applicable.)

Property	Standard	Requirement	Property	Standard	Requirement
Linear Density Fiber Denier	ASTM D5127	±10% of declaration	Infill Size Gradation	EN 933	> declaration
Thickness Fiber Microns	ASTM D5218	±10% of declaration	Infill Slope	EN 14995	±15% of declaration
Fiber height	ASTM D5423	±10% of declaration	Infill Ball Density	EN 13067	±15% of declaration
Tuft Weight (unlocked)	ASTM D5793	Same as specification	Infill Metal Migration	ASTM D1338	Per test specification
Tuft Weight (locked)	ASTM D5548	±100% of specification	g-max Impact Attenuation	ASTM F3554	<135 G's
Total Weight	ASTM D5548	±100% of specification	Force Reduction, AAA	ASTM F3189	55% to 70%
Tuft End (w/o infill)	ASTM D1185	> 4.8 lbs. or 30%	Vertical Deformation, AAA	ASTM F3189	5mm to 11mm
Tuft End (w/ infill)	ASTM D2859	Pass	Hemisphere Impact Attenuation, IHC3	EN 1327	<1,000 @ 1.3m
Tuft Burn (Flammability w/o infill)	ASTM D5034	> declaration	Infill Depth Measurement	EN 13659	60% to 75% of pile height
Break Strength	ASTM D5034	> declaration	Rotational Resistance	EN 15301	30-45 Nm

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BASE CONSTRUCTION

AGGREGATE BASE TESTING:
The following testing must be performed on the aggregate base prior to installation of playing surface.

Property	Standard	Requirement
Determination of water infiltration in the field (4 locations)	EN 12616	>20 in/hr.
Planarity/Surface regularity	EN 13036	<±30 mm
LWD-Prima Compaction testing (10 locations)	ASTM 12835	>40

MATERIALS

MATERIAL VERIFICATION REQUIREMENTS:
The following testing must meet the following requirements to confirm agreement with product declaration. Samples are to be taken from the site on a daily basis per material chosen at contract and staged directly to the material testing laboratory. All equipment of the testing shall be certified by the Synthetic Turf Contractor. Material quality requirements are as follows:

Material Quantity Requirements:

- Synthetic Grass - 1 specimen of 3m x 1.8m
- Performance (IFL) (Minimum) - 1 specimen: 8 (in) heights equal parts taken from the top, middle, and bottom of field
- Staking (IFL) (Max) - 1 specimen: 8 (in) heights equal parts taken from the top, middle, and bottom of field

Property	Standard	Requirement
Tensile Strength	ASTM D2036	Same as specification
Tensile Elongation	ASTM D2036	100% elongation at break
Tensile Modulus	ASTM D2036	100% elongation at break
Tensile Modulus (200% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (1000% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (1500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (2000% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (2500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (3000% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (3500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (4000% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (4500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (5000% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (5500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (6000% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (6500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (7000% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (7500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (8000% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (8500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (9000% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (9500% Elongation)	ASTM D2036	100% elongation at break
Tensile Modulus (10000% Elongation)	ASTM D2036	100% elongation at break

SURFACE INSTALLATION

ON-SITE TESTING OF SYNTHETIC TURF
Post installation testing to be performed on synthetic turf upon completion per the standards and requirements below. All expenses of the testing shall be paid by the Synthetic turf contractor. Results shall be provided to the Landscape Architect and Owner. Contractor shall provide additional material and labor necessary to comply with requirements at no additional cost to the owner.

Property	Standard	Requirement
Determination of water infiltration in the field	ASTM F2698	>20 in/hr.
Planarity/Surface regularity	EN 13036	<±30 mm
"g-max" Impact Attenuation	ASTM F1936	< 135 G's
Hemisphere Impact Attenuation, (HIC)	EN 1177	<1,000 @ 1.0m
Force Reduction, AAA	ASTM F3189	55% to 70%
Vertical Deformation, AAA	ASTM F3189	5mm to 11mm
Infill Depth Measurement (19 Locations)	EN 1969	±3 10% of Specification.

SURFACE INSTALLATION

MONITORING & WARRANTY

ANNUAL ON-SITE TESTING REQUIREMENTS:
Once a year during the warranty period, within 60 days of the original substantial completion date. All expenses of the testing during the warranty period shall be paid by the Synthetic turf contractor. Results shall be provided to the Landscape Architect and Owner.

Property	Standard	Requirement
"g-max" Impact Attenuation	ASTM F1936	< 135 G's
Hemisphere Impact Attenuation, (HIC)	EN 1177	<1,000 @ 1.0m
Force Reduction, AAA	ASTM F3189	55% to 70%
Vertical Deformation, AAA	ASTM F3189	5mm to 11mm
Infill Depth Measurement (19 Locations)	EN 1969	±3 10% of Specification.

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Build it Right

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find an ASSTA affiliate, supplier
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www.sportsbuilders.org or
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