

Technical Guidelines

Brock PowerBase

Synthetic Sub-Base System for Synthetic Turf Fields

Materials, Installation, and Performance Guidelines for Synthetic (Drainage and Impact) Underlayment

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SECTION 02620

Synthetic Base Material and Performance

Scope:

This document defines requirements for the installation and operating performance of an athletic field synthetic base underlayment material needed for a professional-grade synthetic turf field. Defined are the primary system requirements for insuring optimum safety of the playing surface (impact attenuation/surface playability) and high capacity subsurface drainage of the installed playing field.

Specifications listed are defined per applicable ASTM standard test methods, or other internationally recognized testing standards. All other specifications and tolerances listed shall be defined under standard ANSI and/or ISO drawing and specification rules.

Note: This specification requires prior installation of stabilized subsurface base. Included is a perimeter foundation-grade concrete curb and high-capacity trenched storm drain system.

Part 1: Specification References

1.1 Related Specification Sections

Section 02319: Sub-Grade Foundation and Drainage
Section 02792: Synthetic Turf System

Part 2: Testing References

2.1 American Society for Testing and Materials (ASTM):

ASTM F355	Standard Test Method for Shock-Absorbing Properties of Playing Surface Systems and Materials
ISO 1798	Standard Specification for Flexible Materials-Tensile Strength
ASTM F2333	Standard Test Method for Traction Characteristics Of Athletic Shoe-Sports Surface Interface.
ASTM G22-76	Determining the Resistance of Plastics to Bacteria
ASTM 1551	Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials.

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ASTM D4716	Test Method for Determining the (in-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using Constant Head
EN12616	Water Infiltration Rate
ASTMG21-96	Determining Resistance of Synthetic Materials to Fungi
ASTM F925	Test Method for Resistance to Chemicals of Resilient Flooring
ASTM F970	Test Method for Static Load Limit
ISO 8301	Thermal Resistance

Part 3: Sub-Base System Description

- 3.1 General Requirements – An impact energy absorbing sub-base drainage material designed specifically for use with synthetic turf is required. The specified material must have both impact absorption and drainage properties that meet the following typical performance requirements:
- 3.1.1 Vertical drainage - 200" per hour minimum (EN12616)
 - 3.1.2 Surface contact - 50% minimum with synthetic turf backing,
 - 3.1.3 Friction coefficient- movement of artificial turf over 50mm distance 8.92N maximum force ISO 8295
 - 3.1.4 Lateral water transmissivity – 0.00583 m²/sec @ 0.5% slope (ASTM D4716)
 - 3.1.5 Thermal stability not to exceed 3mm per 30 degree C change, ISO 4897.
 - 3.1.6 Thermal Resistance (R Value) minimum 0.6; ISO 8301, EN 12664/7
 - 3.1.7 Tensile strength – min 700 Kpa ISO 1798
 - 3.1.8 GMax of 120G maximum average (ASTM F355) ; system test under infill turf
 - 3.1.9 Shock Absorption 60-70%; EN 14809
 - 3.1.10 Vertical Deformation less than 4mm EN14809
 - 3.1.11 Compression set - 25% strain, 22hrs, 23°C after 24 hrs ISO 1856C, average maximum <3mm residual compression set
 - 3.1.12 Repeated impact compression resistance – 7.45kg/cm² or 106psi, repeated load, 10,000 cycles system test with infill turf; not to exceed 3% ;
 - 3.1.13 Bacteria and Fungi resistance - Pass per ASTM G22-76/G21-96
 - 3.1.14 Environmental testing- Water Quality ESSM 105-d/1997 Pass
 - 3.1.15 Chemical resistance Chemical Resistance - no change to material under total saturation of the following chemicals: ASTM F925
 - Gasoline
 - Brake Fluid
 - Chlorine
 - Underbody coating
 - Transmission Fluid
 - Motor Oil

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Zinc Chloride
Tar and Oil Solvents
Windshield Washer Fluid
Kerosene
Ethylene and Propylene Glycols

- 3.1.16 Product must carry a 20 Year product warranty
- 3.1.17 Material must be 100% recyclable, recycling for energy not acceptable.
- 3.1.18 Manufacturer must demonstrate recycling process as part of the pre-approval process.

Part 4: Quality Assurance

- 4.1 The sub-base (underlayment) material is to be manufactured in an ISO-9000 certified facility. No exceptions allowed.
- 4.2 Company must demonstrate successful installations for at least 5 million sq feet of manufacturers material.
- 4.3 Use only new materials manufactured and shipped for the specific installation. No used, recycled or refurbished materials are to be installed. Manufacturer must provide documentation of material content and MSDS sheet for submittal package
- 4.4 Product to be shipped as flat panels on prepackaged pallets. Pallets to be wrapped with heavy-duty barrier for protection from moisture and UV exposure.
- 4.5 Seams should be mechanically locked into place by hand without use of additional materials, glue, fasteners or secondary processes and equipment.
- 4.6 Material must be installed using manufacturers guidelines, without exception.
- 4.7 Manufacturer must provide written procedures to selected turf supplier for the installation of turf on top of underlayment.
- 4.8 Manufacturer must provide signed 20 year warranty during final field inspection.
- 4.9 All documents must be provided to Owner and Architect upon field completion.
- 4.10 General Contractor must send G-Max test results to Underlayment manufacturer once completed.

Part 5: Submittals

- 5.1 General: Bidding contractor must identify performance base system with bid package. If a non-specified product is identified, the proposed alternate product must be submitted and pre-approved by the design architect/engineer 10 days prior to the bid opening. If bidding contractor does not identify a manufacturer, the Township/School District will assume that the specified product is included in the bid package and will not consider substitutions.
- 5.2 Product Data: Submit 8" x 8" product sample and technical data sheet.

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- 5.3 Shop Drawings: Submit cross-sectional view showing product installation in relation to sub-base and synthetic turf (including edge attachment).
- 5.4 Test Data: Submit listing of all applicable test data for compliance to specifications. All testing to be performed by independent sources following applicable ASTM or other internationally recognized standards and procedures.
- 5.5 Installation: Submit copy of product installation instructions. Submit copy turf installation recommendations.
- 5.6 Warranty: Submit copy of product 20 -Year warranty coverage.

Part 6: Products

- 6.1 Description: Resilient Polypropylene Base Material
- 6.2 Manufacturer: Brock International or pre-approved equal
- 6.3 Contact Information:
 - Brock International
 - 2840 Wilderness Place
 - Boulder, CO 80301
 - Telephone: (303) 544-5800 Fax: (303) 544-1273
 - www.brockusa.com
- 6.4 Manufacturing/Ordering Information:
 - Brock International
 - 2840 Wilderness Place
 - Boulder, CO 80301
 - Telephone: (303) 544-5800
 - Fax: (303) 544-1273
 - www.brock-international.com
- 6.5 Product format:
 - Size: 62 x 48" in interlocking panels.
 - Area: Net coverage per panel 19.54 / sf
 - Thickness: .96" (24mm) +/- .18"
 - Panel Weight: 4.96 lbs / panel
 - Estimated scrap: 1%

Part 7: Product Substitutions

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- 7.1 Product substitutions are allowed only in accordance with pre-bid substitution request procedures outlined in the contract documents. No substitutions will be allowed after the bid date. Bidding contractor must identify performance base system with bid package. If a non-specified product is identified, the proposed alternate product must be submitted and pre-approved by the design architect/engineer 10 days prior to the bid opening. If bidding contractor does not identify a manufacturer, the Township/School District will assume that the specified product is included in the bid package and will not consider substitutions.

Part 8: Installation

- 8.1 Per manufacturer's recommendation - obtain written installation instructions and procedures from the manufacturer.

Part 9: Surplus Material

- 9.1 Surplus materials to be determined by the Owner prior to order and delivery of product to the installation site. Surplus quantities to be identified in writing by the General Contractor at the time of order placement.

Part 10: Project Completion

- 10.1 Upon completion of installation, a walk-through will be conducted to inspect the quality of work and ensure all details meet specifications.
- 10.2 A punch list of unacceptable or incomplete items will be documented and agreed upon for completion prior to final project closeout and acceptance.
- 10.3 Synthetic base manufacturer must provide binder of documentation related to base construction including geotechnical reports, site visit notes, compaction tests and planarity verification results and oversight of synthetic base installation.

Part 11: Approvals

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- 11.1 Finished synthetic base installation workmanship must be approved in advance by the turf manufacturer. Approvals to be based on a physical inspection performed at the site prior to installation of any synthetic turf material.
- 11.2 Any approvals sought after turf installation will be declined. Any associated repair or replacement costs associated with rework of the synthetic base will be the responsibility of the turf supplier/installer.

END OF SECTION

SUBMITTAL INFORMATION

Design Submittal Data Checklist and Certification

All items listed below are mandatory, shall comply with the specification and be
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submitted according to pre-bid submittal requirements for alternate systems.

Included & Reviewed	T a b	Item	Description
	A	Letter/ Checklist	Listing of all information being submitted must be included in a cover letter. List the name of the supplier's local representative and his/her phone number. Signed submittal checklist to be included.
	B	EN12616	Vertical Permeability
	C	ISO 12958	Lateral drainage - System Test
	D	ASTM F1551	Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials
	E	ISO 8295	Carpet Friction (European Test Method) Friction
	F	ISA	Dimensional Stability (European Test Method) (<5 x 10 ⁻⁴ Limit)
	G	ASTM F-355	G-max test method for infill turf (200 limit)
	H	ASTM F-355 Modified	G-max test method for infill turf (200 limit) – 36 impacts simulating 3 years use (avg), no maintenance
	I	ISO 844	Compressive strength
	I	Internal	Compression set – dynamic vehicle loads Compression set – Static vehicle loads
	K	ISO 1856C	Compression set
	L	EN12667	Thermal Conductivity λ Value
	L	EN 12664/7 ISO 8301	Thermal Conductivity R Value

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N	ASTM G-22-76 G-21-96	Resistance of plastics to Fungus Growth
O	ISO 4897	Thermal Expansion
P	Recycling	Provide written recycling program for material
Q	Warranty	Provide written warranty information including all terms and conditions. 20 year minimum
R	Project References	Manufacturer to provide a list of project references of 5 similar projects completed within the past three years.
S	Product Information	Complete set of product brochures.
T	Non-Compliance	Manufacturer shall list all items that are not in compliance with the specifications.
U	Compliance	Manufacturer shall sign off that all requirements of the specifications have been met and that the manufacturer will be responsible for any future costs incurred for all items not meeting specifications to bring their product into compliance and not listed in item T - Non-Compliance.

Manufacturer: _____

Signature: _____

Contact Name: _____

Date: ____/____/____

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