ShockDrain™ KBA 780

• ROLL • RESOLVE • RECYCLE

FOUR SECTIONS

SUBMITTAL

Shock attenuation and synthetic aggregate technology

EN:PLAST

TECHNOLOGY

ShockDrain™ KBA 780

Contents

EN:PLAST
TECHNOLOGY

ShockDrain™ KBA 780

• ROLL • RESOLVE • RECYCLE

SECTION 1
SPECIFICATIONS

ShockDrain™ KBA 780

• ROLL • RESOLVE • RECYCLE

EN PLAST TECHNOLOGY

SPECIFICATION SHEET[1]

Shockdrain KBA - Kynetic Ballast Adjustor - is a synthetic aggregate technology designed for the use beneath synthetic turf to achieve optimum attenuation performance. Additionally, the technology delivers high fluid and air transmissivity and low thermal gradient between sub-grade and turf.

Material Properties	Unit	Values[1]
Composition	Composite	Thermoset Elastomer, Polyolefin Composite
Composite Ballast[2]	lbs/ft^2	1.1
Nominal Thickness	mm	19
Thermal and Humid Aging[3]	%	<1%
Water Absorption[4]	lbs/ft^2 (kg/m^2)	0.02 (<0.06)
Tensile Strength[5]	lb/ft (kN/m)	(MD) 401 (6.6) (TD) 225 (3.7)
Elongation at Break[5]	%	(MD) 60 (TD) 55
Coefficient of Linear Thermal Expansion[14]	in/ft	0.005

Hydraulic Properties	Unit	Values[1]
Transmissivity[7]	gpm/ft/(m^2/sec)	145 (3 x 10^{-2})
Permeability[8] (Perforated)	gal/min/sf	>40
Infiltration Ratio[8] (Perforated)	in/hr	130

Shock Absorbing Properties	Values[1]
Impact Attenuation (Gmax[10])	100-80
HIC[10]	1.5
Advance Artificial Athletes[11]	UPON REQUEST

Chemical Properties	Values[1]
Polycyclic Aromatic Hydrocarbon[12]	No Detectable Level
Common Metals[13]	No Dispersion Above Limit

Dimensions and Delivery

The product shall be delivered to the jobsite in roll form with each roll individually identified and nominally measuring from 4 ft. in width 206 ft. in length. The typical truckload quantity is 90 rolls. Custom roll lengths available upon request.

25 YEAR WARRANTY

[1] Unless indicated otherwise, values shown are typical values. Brief descriptions of test procedures are given in the following notes.

[2] Unit weight of the composite ballast as a measure to stabilize product during installation and resist wind movement.

[3] Response to thermal and humid aging tested in accordance with ASTM D2126-09.

[4] Water absorption tested in accordance with ASTM D3575-08, time of immersion 48 hours.

[5] Tensile strength determined in accordance with ASTM D4595 Modified using test specimens of 100mm (4 in) x 200mm (8 in) strips, initial grip separation of 100mm (4 in), and elongation at break calculated by grip separation.

[6] Enplast modified ASTM D3575 Compression set (15 min load set read at transducer)

[7] Transmissivity determined in accordance with ASTM D4716, under 5.8 kpa (120 psf) and hydraulic gradient 1%.

[8] Permeability ASTM 2434

[9] Infiltration rate BS 7044-4

[10] Shock absorbing Gmax and HIC tested in an infilled synthetic turf field in accordance with ASTM 0716. HIC varies based upon turf pyle height and infill type and ratios. Value reported are tested in cross section 50% sand 50% SBR

[11] Advanced Artificial Athletes tested in an infilled synthetic turf field in accordance with FIFA 01, 04a, 05a, 13. Result varies based upon turf pyle height and infill type.

[12] EPA 8270C SIM PAHs (Solid) tested by Eurofins Calscience test number En-plast 16-01-1335.

[13] EPA 6010B-EPA 7471A tested by Curtis & Tompkins test number En-plast 272962.

[14] ASTM D696 mod.

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ShockDrain™ KBA 780

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SECTION 2
BROCHURE

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ShockDrain™ KBA 780[1]

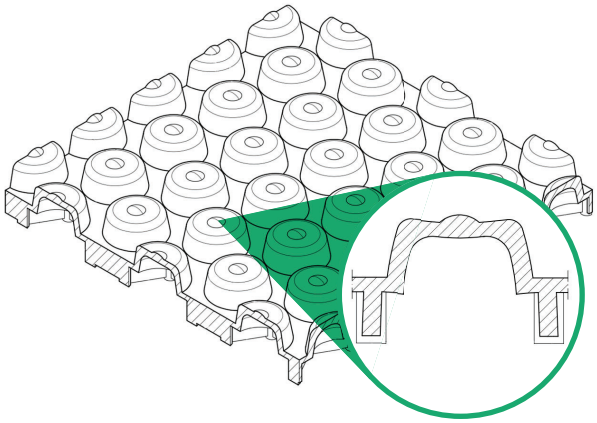
• ROLL • RESOLVE • RECYCLE

1: Patent Pending

ShockDrain KBA 780

ShockDrain™ is an engineered pad manufactured in the U.S. using Thermoplastic Elastomers Polyolefin Composites (TEPC). The pad itself is 100% recyclable from one cradle to another and meets the most stringent regulatory requirements.

ShockDrain KBA 780 is a shock attenuation and synthetic aggregate technology designed for use beneath synthetic turf to achieve optimum athlete performance. The pad is unique and is also used in "new generation" Sports Fields for field foundations and water conservation.



Product Overview

1. **Honeycomb structure** for exceptional sub-surface stability which allows for construction traffic directly on top of the pad during installation.
2. **Shock Absorption Design** Dome construction for optimal impact distribution and 100% thickness retention after impact.
3. **Drainage Surface** 360-degree surface for optimized drainage and the highest drainage pad on the market.
4. **Inlaid panel junctions** to ensure transparent seams (no lines visible on the turf).
5. **Ease of Installation** Pad has ballast, making it stable during windy installations. A latch on the lateral panel allows the connection of side-by-side rolls and there's no need of adhesive.

Benefits of ShockDrain KPA 780

- **High Transmissivity**
- **No Volatile** Organic Compound (VOC) Release
- **Excellent Impact Attenuation & Force Reduction**
- **Moisture Barrier** or Drain-Through Profile
- **Quick Installation**
- **Recyclable** and derived form recycled material
- **Standard Field Requires Only 2 Trucks** (90k Sq. ft.)
- **Made In the USA:** Meets Buy-America Requirements

GMAX
AVG 90

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ShockDrain™ KBA 780[1]

• ROLL • RESOLVE • RECYCLE

1: Patent Pending

Why ShockDrain KPA 780

Shock Absorption
ShockDrain 780 is industry-leading in shock attenuation which reduces impact and fosters a safer playing environment for athletes.

Drainage
ShockDrain 780 is at the forefront of drainage technology, allowing maximum permeability.

Economic Benefits
Our solution is one of the most cost-effective on the market. Don't believe us? Get in touch to learn more.

Ease of Installation
Ballast 1 lbs/sqft. reselient to movement under windy installation.

100% recyclable
Any average field reprocess 5,000 end of life tires.

Hydraulic Properties

Transmissivity GMF	145
STD Infiltration Rate (Perforated) in/hr	130

Shock-Absorbing Properties

Impact Attenuation (Gmax)	100 - 80
HIC	1.5

Chemical Properties

Polycyclic Aromatic Hydrocarbon	No Detectable Level / No VOC
Common Metals	No Dispersion Above Limit / No SVOC's
California Code Title 22	Certified
Bacteria and Fungal Growth	Resiliant

Material Properties

Composition (composite)	Thermoset Elastomer, Polyolefin
Composite Ballast lbs/ft² (kg/m²)	1
Nominal Thickness mils (mm)	780/20
Thermal and Humid Aging (%)	<1%
Coefficient of Linear Thermal Expansion (in/ft)	0.005

About En-Plast

En-Plast is a Houston, Texas based technology business that manufactures engineered pads which utilize post-consumer recycled material and other plastics for a variety of in-ground and above ground applications.

Our products are unique and used for innovative purposes including, but not limited to: impact absorption, water conservation, noise pollution, reinforcement, and foundations. En-Plast sources raw materials that are under-utilized or wasted, exemplifying our mission to deliver products that are environmentally friendly. Our facility is strategically located to ensure the quick distribution and installation of our products through direct sale and strategic partnerships.

Our team has a storied history in the synthetics industry, with over 60 years combined experience amongst our executive team.

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SECTION 3
SUBMITTAL

SECTION 00000

SYNTHETIC SPORT FIELD IMPACT and DRAINAGE LAYER

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, material, equipment, and incidentals required to install a polyethylene-encapsulated SBR granules extruded SYNTHETIC SPORTFIELD IMPACT DRAINAGE LAYER (SSIDL) as shown on the drawings and as specified herein. The SSIDL will be perforated to allow vertical drainage into an existing stone drainage layer.

1.02 SUBMITTALS

The contractor shall submit the following to the Engineer:

1. Mill Certificate and Sample: Prior to shipping to the site, the Contractor shall submit one copy of a mill certificate or affidavit signed by a legally authorized official of the Manufacturer for the SSIDL attesting that the SSIDL meets the physical and manufacturing requirements stated in these Specifications. The Contractor shall also submit a sample (12" x 12") of the SSIDL to be used. The sample shall be labeled with the product name and be accompanied by the Manufacturer's specifications.

2. Shipping, Handling, and Storage Instructions: The Manufacturer's plan for shipping, handling, and storage shall be submitted for review.

1.03 REFERENCE STANDARDS

A. American Society of Testing and Materials (ASTM)

1. ASTM D624-00 Standard Test Method for determining Tear Resistance
2. ASTM D3574-05 (Test E) Modified Test Method for determining Tensile Strength
3. ASTM D5199, Standard Test Method of Thickness measure.
4. ASTM D4716, Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width.
5. ASTM D2126-09 Standard Test Method for determining response to thermal and humid aging.
6. ASTM D3575-08 Standard Test Method for determining water absorption.
7. ASTM F1936 Standard Test Method for determining Shock Absorption Gmax and HIC.
8. ASTM DF355-10a Standard ASTM Test Method for determining Impact attenuation of playing surface systems and materials.
9. ASTM DF1551-09 Standard ASTM Test Method for determining Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials – water permeability
10. ASTM D1621 Standard Test Method for determining compression strength

PART 2 PRODUCTS

2.01 MATERIALS

A. The extruded thermoplastic elastomer polyolefin composite SYTHETIC SPORT FIELD IMPACT DRAINAGE LAYER (SSIDL) shall be manufactured by extruding a blend of thermoplastic elastomer and polyethylene that forms a three dimensional structure. The SSIDL pad will be perforated to allow vertical drainage into an existing stone drainage layer.
B. The SSIDL shall have a heat engraved vertical ridge manufactured in the machine direction on the top surface with a honeycomb structure on the bottom surface that proper impact attenuation, lateral confinement and dimensional stability.
C. The SSIDL shall have a locking ridge on each edge of the manufactured SSIDL that allows for the adjoining edge of two panels to be secured to one another as shown in the drawings.
D. The SSIDL shall have a minimum of two Expansion and Contruction Joints to absorb lateral movement under temperature variation, granting a lateral coefficient of Linear Thermal expansion of less than 0.0025 in/ft.
E. The SSIDL shall have a minimum density of 27.8lb/f3
F. The SSIDL shall be **ShockDrain KBA 780** as manufactured by EN-PLAST Technology Systems, LLC (17510 Carlsway Road, Houston, TX 77073 www.en-plast.us – Phone 281-821-7703), or engineer approved equal.
G. Alternative SSIDL material shall be submitted for Architect/Engineer's approval and must demonstrate performance equivalency to the properties listed in **Table 1**. Any alternative drainage material to be considered for approval must be submitted to Architect/Engineer 3 days prior to the pre-bid meeting or 2 weeks prior to the bid date, whichever happens first. After such date no alternative drainage material will be considered.
H. Alternative SSIDL materials that fail to have top drainage channels and to meet the specifications herein and properties listed in **TABLE 1** will not be accepted.

2.02 DELIVERY, STORAGE, AND HANDLING

A. The SSIDL shall be shipped, stored and handled in accordance with Manufacturer's recommendations as specified herein.
B. The SSIDL shall be stored in such a way that it is protected from construction damage.
C. Rolls shall be stacked in a pyramid configuration with a maximum of 2 rolls high.
D. The lowest rolls shall be held off the ground by means of pallets or other similar methods.

2.03 MATERIAL WARRANTY

A. The Contractor shall furnish the Owner a written warranty from the SSIDL manufacturer that shall warrant the material against manufacturing defects and conform to the specifications stated herein at the time of delivery for a minimum of 25 years. Furthermore manufacturer should warranty a min GMax of 120 for at least two years of turf cycle..
B. Should a defect occur, which is covered under warranty, the Warrantor shall bear all costs for the repair and/or relocation and replacement of the SSIDL.

SHOCKDRAIN KBA 780

drainage, pad, liner

TABLE 1

Material Properties	Unit	Values[1]
Composition	Composite	Thermoset Elastomer, Polyolefin Composite
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Elongation at Break[5]	%	(MD) 60 (TD) 55
Coefficient of Linear Thermal Expansion[14]	in/ft	0.005

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PART 3 EXECUTION

3.01 INSTALLATION

A. Panel Placement and longitudinal Field Seams

1. Care shall be taken to keep the SSIDL clean and free from debris prior to installation. If the SSIDL is not clean, it shall be washed prior to installation.

2. The SSIDL shall be installed in such a manner as to ensure that it is not damaged in any way, and the following shall be complied with during installation.

   A. The installer shall place the En-Plast ShockDrain KBA 780material in the proper manner at the elevations and alignment as shown in the construction drawings and as directed by the Engineer.

   B. Install En-Plast ShockDrain KBA 780in-conjunction with the synthetic turf deployment, allowing no more than 25 yards of En-Plast ShockDrain KBA 780 to be exposed ahead of artificial turf. It is important to roll out the En-Plast ShockDrain KBA 780with the roofed end of the roll on top. After the first roll is deployed and positioned, a second roll is deployed adjacent to the previous roll. The roofed section of the second roll is then connected to the last channel of the first roll to assure a positive connection along the entire length of the roll. Care should be taken to make sure this positive connection is achieved throughout the entire length of the roll. Securing the longitudinal Joints is required before the turf is installed on the Enplast ShockDrain material.

   C. The SSIDL shall be tight and flat on the underlying substrate. Care shall be taken to ensure that wrinkles do not occur.

   D. For protection and proper performance, no machinery or equipment shall be allowed on the SSIDL unless previously approved by the Engineer and Manufacturer. Use of a low ground pressure All-Terrain Vehicle (ATV) that exerts a maximum of 6 psi may be used to install the geosynthetics if approved by the Engineer and Manufacturer. Vehicles, machinery, and equipment shall be operated to avoid abrupt stops, starts, and/or turns.

   E. The SSIDL shall be cut using scissor or other cutting tools approved by the engineer. Care shall be taken to not leave tools on the SSIDL after installation.

B. Field Seams

1. The following requirements shall be met during installation of the SSIDL:

   A. All butt seams shall maybe laid adjacent to the next panel or glued with 12 inch seaming tape and glue, such as Helmitin Helmicol 3407 or approved equal. Adhesive manufacturer's instructions should be followed completely.

Butt seams should be followed completely. Butt seams should be ballasted until the adhesive is cured.
Any rips, tears or damage areas on the deployed En-Plast ShockDrain KBA 780 shall be removed and patched by placing a patch sized and seamed with the approved seaming materials.

B. Field Seams
C. Butt Seams

END OF SECTION

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ShockDrain™ KBA 780

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SECTION 4
WARRANTY

EN:PLAST TECHNOLOGY

Limited Material Warranty for En-Plast Technology, LLC (U.S.A.)

Date: _____ Warranty No.: _____

Purchaser Name: _____ Project No.: _____

Address: _____ Effective Date: _____

City, State: _____ Project Name: _____

Product Type/Description: _____ Project Address: _____

En-Plast Technology, LLC warrants each EN-PLAST product described above to be free from material manufacturing defects (as described by the contract's material specifications) and to be able to withstand normal weathering for a period of **Twentyfive (25) years** from the date of sale. This limited warranty does not include damages or defects in the EN-PLAST product resulting from acts of God, casualty or catastrophe, including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" does not include, among other things, the exposure of En-plast's product to harmful chemicals, abuse by machinery, equipment or people; improper site preparation or placement of cover materials; excessive pressures or stresses from any source. This warranty is intended for commercial use only and is not in effect for the consumer as defined in the Magnuson-Moss Warranty Act.

Should defects or premature loss of use within the scope of this warranty occur, En-Plast will, at its option, repair or replace the defected En-Plast product in the affected area. En-Plast shall have the right to inspect and determine the cause of the alleged defect in the product and to take appropriate steps to repair or replace the product and repair the turf area affected if a defect exists that is covered under this warranty.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail or courier, to En-Plast Technology, LLC, 17510 Carlsway, Houston TX 77073, with the words "Warranty Claim" clearly marked on the face of the envelope, within ten (10) days of Purchaser becoming aware of the alleged defect. Should the required notice not be given, the defect and all warranties are waived by the Purchaser, and Purchaser shall not have rights under this warranty. EN-PLAST shall not be obligated to perform any inspection or obligated to perform any repair or replacement under this warranty until the area is made available free from all obstructions, water, dirt, sludge, residuals and liquids of any kind. If after inspection it is determined that there is no claim under this warranty, Purchaser shall reimburse EN-PLAST for its costs associated with the site inspection.

In the event the exclusive remedy provided herein fails in its essential purpose, and in that event only, the Purchaser shall be entitled to a return of the purchase price for so much of the product as EN-PLAST determines to have violated the warranty provided herein. EN-PLAST shall not be liable for direct, indirect, special, consequential or incidental damages resulting from a breach of this warranty including, but not limited to: damages for loss of production, lost profits, personal injury or property damage. EN-PLAST shall not be obligated to reimburse Purchaser for any repairs, replacement, modifications or alterations made by Purchaser to En-plast's product, unless EN-PLAST specifically authorized, in writing, said repairs, replacements, modifications or alterations in advance. EN-PLAST liability under this warranty shall in no event exceed the replacement cost of the product sold to the Purchaser for the particular installation in which it failed.

EN-PLAST neither assumes nor authorizes any person other than an officer of EN-PLAST to assume for it any other or additional liability in connection with the EN-PLAST product made on the basis of the Limited Warranty. **EN-PLAST MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN HEREIN AND HEREBY DISCLAIMS ALL WARRANTIES, INCLUDING BOTH EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, AND BY ACCEPTING DELIVERY OF THE PRODUCT, PURCHASER WAIVES ALL OTHER POSSIBLE WARRANTIES. En-plast's WARRANTY BECOMES AN OBLIGATION OF EN-PLAST TO PERFORM UNDER THE WARRANTY ONLY UPON RECEIPT OF FINAL PAYMENT.**

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