

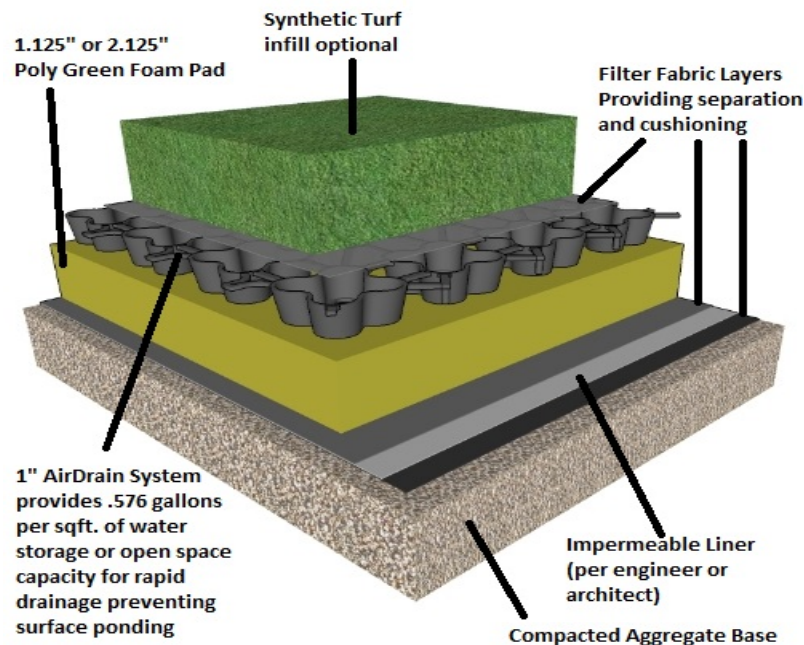
AirDrain – What drains better than Air?

Playground Drainage for 9 ft Fall Height

Not all drainage is created equal! AirDrain offers 100% vertical drainage and has 92% air void. This combination effectively collects and redirects water easily. Additionally, AirDrain raises the entire profile a full 1", letting gravity drain the entire playground quickly and efficiently. The combined effect of AirDrain is a more stable surface area, reduced expenses for repairs and more play time.

A drainage system should allow for water to quickly drain away from the surface and be directed to exit drains, thus allowing a shorter turnaround time for the continuation of play. AirDrain provides drainage which is unmatched in the industry – up to 40gpm/sf – allowing the surface to be free of water. AirDrain is only limited by the drainage capacity of the profile above and the capacity of the exit drains.

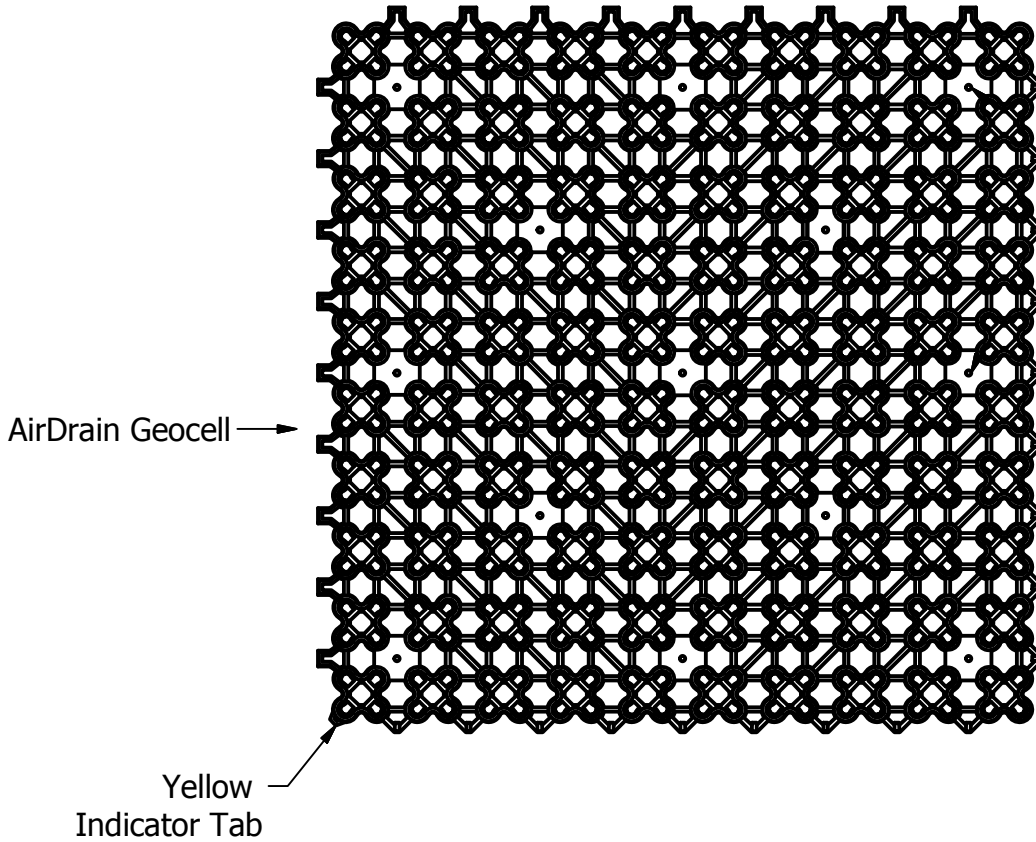
For playgrounds constructed with AirDrain the grid is installed on top of a 2.125" poly green foam pad which is placed directly onto the properly prepared subbase of concrete, asphalt or compacted aggregate. This creates a 1" air void and allows for maximum drainage.



Benefits of an AirDrain playground drainage system include:

- AirDrain raises the entire profile 1" off the subbase and brings gravity into play
- AirDrain's 92% air-void space allows for fast and easy water removal
- Consistent **HIC** and **Gmax** for the life of the AirDrain provides a safe play area
- AirDrain is a 100% recycled copolymer which has the impact modifier "metallocene" added to it for qualification as a "No Break" plastic, making it able to withstand extreme heat and cold and still maintain performance
- AirDrain's quick snap connectors allows for effortless installation
- Minimal site disturbance, excavation and disposal
- Compact shipping reduces transportation costs

*This drawing, specifications and the information contained herein is for general presentation purposes only. All final drawings and layouts should be determined by a licensed engineer(s). HIC & Gmax testing are measured in a lab setting and are not site specific.



Unit Panel Specifications:

- Size: 32" x 32" x 1"
- Weight: 3.1 lb
- Volume: 8% material, 92% air void
- Strength: 233 psi (unfilled)
- Resin: 100% Recycled (PIR)
Copolymer with Impact Modifier
"No Break" Polymer Material
- Color: Black (3% carbon black added for UV Protection)

AirDrain Cross Section

Scale 0.12:1

Typical

For AirDrain Grass Systems

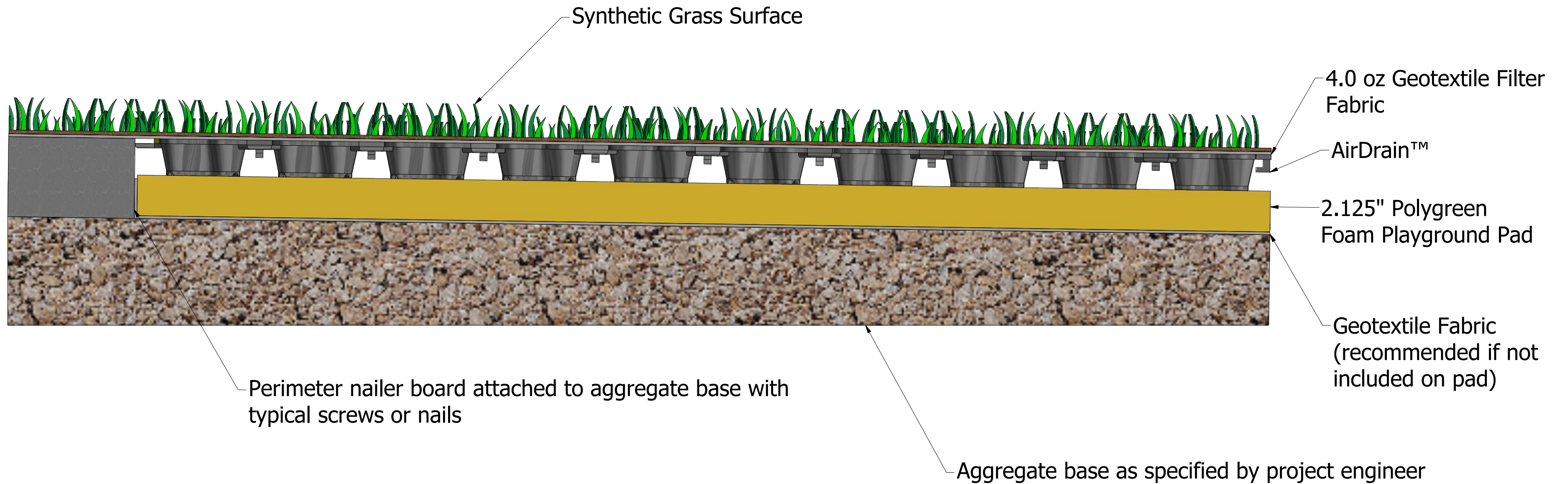


Airfield Systems, LLC
8028 N May Ave, Suite 201
Oklahoma City, OK 73120
(405) 359-3375

www.airfieldsystems.com

Drawing No. ADCS002.dwg

AirDrain Application with Pad Below AirDrain for Aggregate Base



AirDrain™ Unit Panel Specifications:

- Size: 32" x 32" x 1"
- Weight: 3.1 lb
- Volume: 8% material, 92% air void
- Strength: 233 psi (unfilled)
- Resin: 100% Recycled (PIR)
Copolymer with Impact Modifier
"No Break" Polymer Material
- Color: Black (3% carbon black added for UV Protection)



DRAWN G. Abdo	2/22/2015	AirField Systems		
CHECKED				
QA		TITLE AirDrain Application with Pad Below AirDrain		
MFG		SIZE C	DWG NO Playground_AFS_SP_Under	REV REV_001
APPROVED		SCALE	SHEET 1 OF 1	

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TESTING SERVICES, INC.
 817 SHOWALTER AVE., PO BOX 2041
 DALTON, GA 30722-2041
 PHONE: (706)226-1400 FAX: (706)226-6118



TEST REPORT

CLIENT:	Airfield Systems	REPORT NUMBER:	62296
	8028 North May Avenue Suite 201	LAB TEST NUMBER:	2650-1155-1
	Oklahoma City, OK 73120	DATE:	November 7, 2014
REQUESTED BY:	Michael Bean	PAGE:	1 of 2

Turf Description	ATS Turf 69sl/st		Top
Infill System	None		
Underlayment	8 oz Filter Fabric		
Grid:	AirDrain		
Pad System:	2 1/8" Polygreen Foam		
Sub Base	Concrete		Bottom

Tested Dimension: 3' X 3'

Impact Location: Various

Date of Receipt: August 9, 2014

Testing Period: September 9-12, 2014

Authorization: Micheal Bean

Test Procedure: The submitted sample was evaluated for Shock Absorbing Properties in Accordance with the procedures outlined in ASTM F 1292-10; Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment

Missile: Hemispherical (Triaxial Accelerometer): Total Drop Assembly Weight (46g) 10 lbs

Test Equipment: Triax 2000 Surface Impactor
 Date of Last Calibration: 4/16/2014 by Alpha Automation (Valid thru 5/16/2015)

Sample Pre-Condition: 50±10 RH, 70F±5F for a minimum of 24 hrs prior to testing

Temperature: Maximum Drop Height That Gives a Gmax of 200 or Less and A HIC of 1000 or less

Ambient, 61.7°F 38% RH 9'

Hot, 120°F (49°C) 9'

Cold, 25°F (-6°C) 9'

Critical Fall Height (CFH): 9'

Prepared and signed by:

Digitally signed by Erle Miles, Jr. VP
 DN: cn=Erle Miles, Jr. VP, o=Testing Services Inc., ou, email=tsi.office@windstream.net, c=US
 Date: 2014.11.07 15:54:18 -0500

Erle Miles, Jr. VP
 Testing Services Inc.

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Client: Airfield Systems
 8028 North May Avenue Suite 201
 Oklahoma City, OK 73120

Test: ASTM F1292: Impact Attenuation of Surface Systems in and Around
 Playground Equipment

Turf ID	ATS Turf 69sl/st	Top
Infill	None	
Underlayment:	4 oz Filter Fabric	
Grid:	AirDrain	
Underlayment:	2 1/8" PolyGreen Foam	
Sub Base:	Concrete	Bottom

Conditions: Ambient, 83°F 39% RH Report #: 62197 Page # 2 of 4
 Date Tested: 9-Sep-14 Fall Height: 9' Lab # 2650-1155-1

Drop Area:**Center of Assembly**

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	23.9	7	9'	8.88	128	834
2	23.9	0	9'	8.88	133	884
3	23.9	0	9'	8.88	132	874
Average			Drops 2, 3		133	879

Quadrant of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	23.9	3	9'	8.88	122	767
2	23.9	2	9'	8.88	134	895
3	23.9	1	9'	8.88	141	964
Average			Drops 2, 3		138	930

Quadrant of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	23.9	0	9'	8.88	128	845
2	23.9	4	9'	8.88	132	871
3	23.9	3	9'	8.88	137	919
Average			Drops 2, 3		135	895

Quadrant of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	N/A	N/A	N/A	N/A	#VALUE!	N/A
2	N/A	N/A	N/A	N/A	#VALUE!	N/A
3	N/A	N/A	N/A	N/A	#VALUE!	N/A
Average			Drops 2, 3		#VALUE!	#VALUE!

Overall gmax (3 Locations, Three Drops Each Location in Same Spot) 135

Overall HIC (3 Locations, Three Drops Each Location in Same Spot) 901

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 8028 North May Avenue Suite 201
 Oklahoma City, OK 73120

Test: ASTM F1292: Impact Attenuation of Surface Systems in and Around
 Playground Equipment

Turf ID	ATS Turf 69sl/st	Top
Infill	None	
Underlayment:	4 oz Filter Fabric	
Grid:	AirDrain	
Underlayment:	2 1/8" PolyGreen Foam	
Sub Base:	Concrete	Bottom

Conditions: Cold Min 8hrs @ 20°F Report #: 62296 Page # 3 of 4
 Date Tested: 10-Sep-14 Fall Height: 9' Lab # 2650-1155-1

Drop Area:

Center of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	24.0	6	9'	8.95	123	799
2	24.0	7	9'	8.95	131	858
3	24.0	5	9'	8.95	136	885
Average			Drops 2, 3		134	872

Quadrant of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	24.0	0	9'	8.95	133	908
2	24.0	3	9'	8.95	140	972
3	24.0	5	9'	8.95	147	1020
Average			Drops 2, 3		144	996

Quadrant of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	24.0	7	9'	8.95	129	859
2	24.0	3	9'	8.95	144	990
3	24.0	2	9'	8.95	150	1027
Average			Drops 2, 3		147	1009

Quadrant of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	23.9	7	9'	8.88	117	726
2	24.0	3	9'	8.95	124	786
3	24.0	2	9'	8.95	132	848
Average			Drops 2, 3		128	817

Overall gmax (4 Locations, Three Drops Each Location in Same Spot) 138
 Overall HIC (4 Locations, Three Drops Each Location in Same Spot) 923

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 Playground Equipment

Turf ID	ATS Turf 69sl/st	Top
Infill	None	
Underlayment:	4 oz Filter Fabric	
Grid:	AirDrain	
Underlayment:	2 1/8" PolyGreen Foam	
Sub Base:	Concrete	Bottom

Conditions: Hot Min 8 hrs @ 120°F Report #: 62197 Page # 4 of 4
 Date Tested: 11-Sep-14 Fall Height: 9' Lab # 2650-1155-1

Drop Area:

Center of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	24.0	7	9'	8.95	126	815
2	24.0	6	9'	8.95	133	868
3	24.1	3	9'	9.03	129	833
Average			Drops 2, 3		131	851

Quadrant of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	24.0	5	9'	8.95	130	859
2	24.0	3	9'	8.95	134	882
3	24.0	0	9'	8.95	135	895
Average			Drops 2, 3		135	889

Quadrant of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	23.9	8	9'	8.88	120	766
2	24.0	8	9'	8.95	131	862
3	23.9	1	9'	8.88	129	851
Average			Drops 2, 3		130	857

Quadrant of Assembly

Drop #	Velocity ft/sec	Angle	Drop Ht/Actual	Drop Ht/Theoretical	Gmax	HIC
1	N/A	N/A	N/A	#VALUE!	N/A	N/A
2	N/A	N/A	N/A	#VALUE!	N/A	N/A
3	N/A	N/A	N/A	#VALUE!	N/A	N/A
Average			Drops 2, 3		#VALUE!	#VALUE!

Overall gmax (4 Locations, Three Drops Each Location in Same Spot) 132
 Overall HIC (4 Locations, Three Drops Each Location in Same Spot) 866

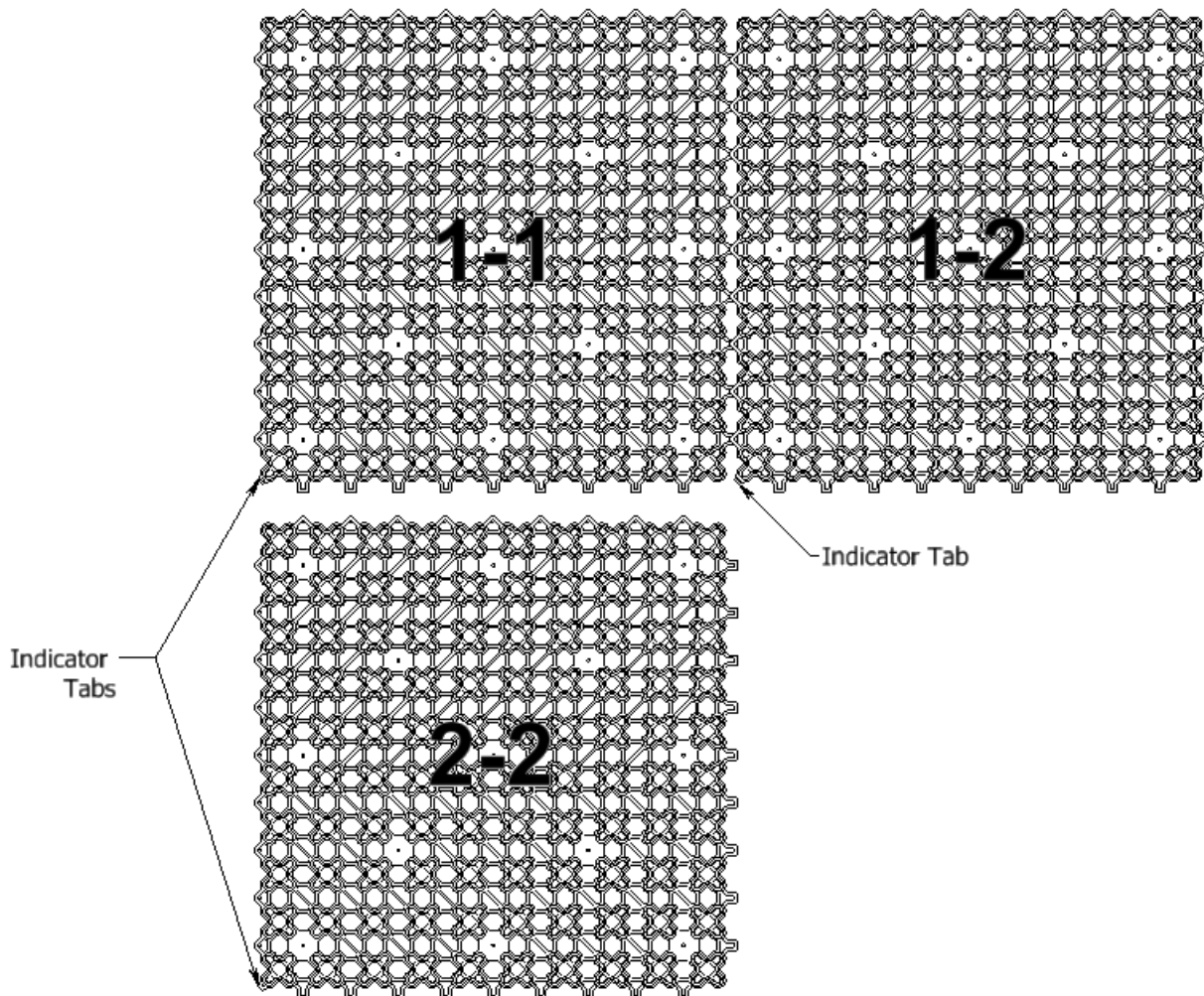
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Proper Sequencing and Orientation of AirDrain GeoCell Panels for Rapid Installation

Pallet Staging: AirDrain pallets cover approximately 798sqft. per pallet and should be staged accordingly within the installation area to minimize the amount of time to stage the AirDrain grid. AirDrain pallets are typically placed every 65 feet across and 15-20 feet back from each other. (Call AirField with questions that you might have about proper staging and installation.)

All Installations must start in the Top Left Corner of the Field and work Left to Right to be installed properly.

1. Orientate the AirDrain GeoCell materials with the integral indicator tab to the panel's bottom left corner (painted yellow). **Install the AirDrain units by placing units with the connectors and platforms up to create a flat surface for the profile above. If the male connectors do not fall or drop into the female connectors then the orientation is incorrect. Please call AirField Systems Immediately at 405-359-3775.**



2. Install the AirDrain panels across the field in a rowed pattern. Staggering of rows will allow for multiple row completion by a multi-manned crew.
3. Once the first row has progressed across the project, start with a second row. Have a person staging the panels in groups of three snapped together along the row. The crew can then install the left side of the panel while elevating slightly the top portion (so the male and female connectors don't touch each other). Once the left side has been snapped with a pull along the row direction, the top portion should fall into place and with a bottom vertical pull holding the inside of parts 1 & 3 snap all three parts in place.



4. AirDrain panels can be shaped to individual field areas as needed with appropriate cutting device. If a typical field is installed correctly there should only be two sides that would need to be trimmed.
 - A. If only a few parts need to be trimmed, use tin snips.
 - B. If many parts require trimming, set up a table and use a circular saw with a no melt, plastic cutting saw blade.

Visit [AirField Systems Flickr page](#) to watch a video of a 74,000 sq ft project for Chesapeake Energy illustrating a 3 man crew installation.

DISCLAIMER: The preceding and following drawings and/or general installation guidelines are provided only to show a concept design for installation and are not instructions for any particular installation. These drawings and general instructions are not complete and are provided only to assist a licensed Geo-Technical Engineer, a Landscape Architect and/or Civil Engineer in preparing actual construction and installation plans. These drawings and instructions must be reviewed by a licensed Geo-Technical Engineer, a Landscape Architect and/or Civil Engineer and adapted to the condition of a particular installation site and to comply with all state and local requirements for each installation site. THESE DRAWINGS AND/OR GENERAL INSTRUCTIONS DO NOT MODIFY OR SUPPLEMENT ANY EXPRESS OR IMPLIED WARRANTIES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IF APPLICABLE RELATING TO THE PRODUCT.

General Information			
General			
Construction	Injection Molded Copolymer		
Composition	Copolymer Polypropylene Using an Impact Modifier		
Dimensions	31.784" x 31.880" x 1.000" (7.03 sq ft.)		
Unit Weight	3.1 lbs.		
Material	Resin Pellets		
Shipping			
Parts Per Pallet	114		
Pallet Dimensions	33" x 33" x 48"		
Pallet Weight	390 lbs.		
Area Coverage Per Pallet	798 sq. ft.		
Pallets Per Trailer	114 (3 wide x 2 tall x 19 deep)		
Area Covered Per Trailer	90,972 sq. ft.		
ASTM and ISO Properties ¹			
Physical	Nominal Value	Test Method	
Specific Gravity	0.940	ASTM D792	
Melt Mass-Flow Rate (230°C/2.16 kg)	20 g/10 min	ASTM D1238	
Mechanical	Nominal Value	Test Method	
Density	57.490 lb/ft ³	ASTM D1505	
Tensile Strength (Yield, 73°F)	2,145 psi	ASTM D638	
Tensile Elongation (Yield, 73°F)	16%	ASTM D638	
Flexural Modulus (73°F)	100,175 psi	ASTM D790	
Compression Strength (73°F)	233 psi unfilled	ASTM D6254	
Impact	Nominal Value	Test Method	
Notched Izod Impact (73°F, 0.125 in)		ASTM D256	
Thermal	Nominal Value	Test Method	
Deflection Temperature Under Load 264 psi, Unannealed	160°F	ASTM D648	
Expansion/Contraction Index ¹			
Temperature	Humidity	Length	Width
100°F	98%	31.881"	31.817"
-5°F	0%	31.765"	31.713"
Change		.116"	.104"
Joint Expansion/Contraction Capacity		.420"	.572"
Safety Factor		362%	550%
Examples of Usage			
Application	Required Strength	Safety Factor	
Auto	40 psi	x 168	
Truck	110 psi	x 61	

¹ Independent laboratory testing conducted by TRI/Environmental, Inc., TSI/Testing Services, Inc. and Wassenaar.

100% Post Manufactured Content



Recycled

The **AirDrain** GeoGrid is made of 100% post-manufactured material, you can feel good about helping the planet [while adding valuable LEED Points](#) to your project! We also add an impact modifier for incredible strength and superior performance in extreme heat and cold - on top of the already durable **AirDrain** design.

AirDrain Co-Polymer with an Impact Modifier Performance and Temperature Durability

Attached you will find the specification of the resin used to produce both the 32 x 32 and the 32 x 18 Geo cells. This material is a co-polymer polypropylene that is 100% recycled resin. In order to be able to produce a consistent recycled resin a PIR (post industrial resin) is used for the base resin. This is the only way to produce a consistent material as opposed to a PCR (post consumer resin) which is dependent on the consumer to supply a consistent material. Using the PIR as a base resin 3% carbon black is added to insure good UV stabilization and metallocene (an ethylene base material) is used as an impact modifier.

Impact Modifier

The impact modifier is added in an amount to achieve a 10.0 Notched Izod Impact which comfortably qualifies this material as a NO BREAK material (4.0 and greater are normally considered no break material). The **AirDrain** resin offers an advantage over many ethylene and HDPE products since the **AirDrain** resin is often superior when it comes to pliability, warping and internal stress related issues. Referring to the attached specification sheet you will notice that all testing is done to specific ASTM Standards.

Resin Blends

AirDrain's blend of resins gives it the ability to perform in extreme temperatures. **AirDrain** does not need a temperature above 50 degrees Fahrenheit to be installed or warmed in the sun to be pliable on site for install. In addition, **AirDrain's** unique resin blend also helps prevent breakage and cracking in extreme temperatures, thus giving it the ability to withstand repeated freeze thaw cycles.

Airfield posts its resin content and performance values with ASTM test methods and guide lines to measure the properties of our grid.