

Laboratory Testing on Artificial Turf Systems

Artificial turf playing fields are systems of components that include the field base and structure, shock pad, carpet, and infill material. The interplay of all of the elements together impact the playing experience of the field. MCPS has worked to review and analyze the field conditions of our artificial turf playing fields, and to evaluate whether adjustments are needed to any combination of the field system components to improve playing conditions.

MCPS sent samples of all of the materials for independent testing of abrasion and friction of various combinations of the field system components. It is important to note that there is not an established safety or minimum standard for abrasion and friction. For comparison, the laboratory that completed our testing used the FIFA world cup field standard as a reference point for the test outcomes. The testing indicated that while there are variations in the performance of various system combinations, there is not evidence that any single field element is sufficiently problematic on its own to warrant discontinuing use.

The various field elements operate to produce different outcomes in combination. For example, the field system at Walt Whitman High School is within the FIFA standard range for the level of abrasion, but is outside the FIFA range for the degree of friction. This would indicate that the Walt Whitman High School field is too smooth by FIFA standards. The Richard Montgomery High School field was outside of the FIFA standard for abrasion, but within the range for the degree of friction. The same field components of the Richard Montgomery High School field produced different results within or closer to the FIFA world cup parameters in different combinations and proportions, for example at the Albert Einstein High School field. Modifying combinations and proportions of the field components can bring the overall field closer to a preferred range.

The test results and summary report indicate that adjustments to the system components of the existing fields will continue to improve field conditions and support a positive playing experience. We will continue to monitor field conditions and adjust as necessary as we implement our ongoing maintenance program. We also will continue to maintain open communication with our parents/guardians, student athletes, school leadership, and community partners as we move forward to ensure that we understand how each field is performing.

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- MCPS engaged in testing services with Labosport, one of the world leading sports surface experts, at the recommendation of the Synthetic Turf Council. Testing included systems as installed and also included additional testing of theoretical combinations to determine the optimal combination, as well as benchmark testing with crumb rubber systems previously utilized by MCPS.
- Testing was conducted in accordance with Fédération Internationale de Football Association (FIFA) Test Method 08. This test is conducted to determine the performance of surface friction of the playfield surface. This is the only known test that was established for FIFA competition level artificial turf fields.
- Below is a key to the report Summary on the following page.

	System A	System B	System C*	System D	System E & E'	System F	System G
Synthetic Turf	Sprinturf	Actglobal	Sprinturf	Sprinturf	Sprinturf	Actglobal	Sprinturf
Infill	Zeofill & Sand (Layered)	Ida-Ore Zeolite & Sand (Mixed)	Zeofill & Sand (Mixed)	Sand	Ida-Ore Zeolite & Sand (Mixed)	Zeofill & Sand (Mixed)	Crumb Rubber & Sand
Schools with System	Richard Montgomery HS (initial installation)	Walt Whitman HS	Albert Einstein HS RMHS (mixed after installation in the field)	For testing only	For testing only Installation for Julius West MS	For testing only	For testing only

C:* Sand and zeolite infill mixed together before being poured into the turf carpet

E and E': System E was retested for results validation

- Synthetic Turf A: Sprinturf- DFE 52
 - Installed at Richard Montgomery High School and Albert Einstein High School
- Synthetic Turf B: Actglobal- Extreme Turf BDX50
 - Installed at Walt Whitman High School
- Zeolite A: Zeofill manufactured by AstroTurf
 - Installed at
 - Richard Montgomery High School: Original install according to System A test; RMHS system later adjusted by contractor mixing the infill in place to approximate System C test results
 - Albert Einstein High School: Installed in accordance with System C test
- Zeolite B: Sport Turf (14X40 mesh) product manufactured by Ida-Ore Zeolite
 - Installed at Walt Whitman High School

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SUMMARY

System configuration:

Infill Rate	System A	System B	System C*	System D	System E	System F	System G
Synthetic turf	Turf A	Turf B	Turf A	Turf A	Turf A	Turf B	Turf A
Sup. layer	Zeolite A: 0.4 lbs/ft ² (1.7 kg/m ²)	Zeolite B: 3.1 lbs/ft ² (15.0 kg/m ²)	Zeolite A: 0.4 lbs/ft ² (1.7 kg/m ²)	9.2 lbs/ft ² (45.0 kg/m ²)	Zeolite B: 2.6 lbs/ft ² (12.5 kg/m ²)	Zeolite A: 0.4 lbs/ft ² (1.7 kg/m ²)	Crumb Rubber: 1.6 lbs/ft ² (7.5 kg/m ²)
Inf. layer	8.6 lbs/ft ² (42.0 kg/m ²)	5.5 lbs/ft ² (27.0 kg/m ²)	8.6 lbs/ft ² (42.0 kg/m ²)		4.6 lbs/ft ² (22.5 kg/m ²)	11.0 lbs/ft ² (54.0 kg/m ²)	4.6 lbs/ft ² (22.5 kg/m ²)
Carpet pile length	1.6" (41mm)	2.0" (50mm)	1.6" (41mm)	1.6" (41mm)	1.6" (41mm)	2.0" (50mm)	1.6" (41mm)
Approx. thickness	1.2" (30mm)	1.5" (38mm)	1.2" (30mm)	1.2" (30mm)	1.2" (30mm)	1.5" (38mm)	1.2" (30mm)

*sand and zeolite infill mixed together before to be poured in the carpet.

Tests results:

Property	Method	Units	System A	System B	System C	System D	System E	System E'	System F	System G	FIFA Requirements*
Skin / Surface Friction	Coefficient of Friction	Index	0.68	0.80	0.70	0.69	0.69	0.73	0.84	0.71	0.35 – 0.75
	Coefficient of Abrasion	%	-128	-20	-59	-79	-20	-22	-42	-3	± 30 %

*FIFA requirements are taken from FIFA Handbook of Requirements – 2015 Edition and are used for comparison purpose only.