

# FIELDturf®

## MSP

### **MAXIMUM SAFETY AND PERFORMANCE**

#### **The Science of Safety and Performance**

As a coach, administrator or parent, you go to great lengths to make sure your athletes have the best protection possible. From helmets, to padding, to footwear - only the safest most reliable equipment will do. But what about the field?

A field that is too hard can increase the risk for devastating neural, cranial and cervical injuries. A field that is too soft increases the likelihood for ankle and ACL injuries. With an overly soft field, the athlete's potential for premature exhaustion is also increased, as a result, athletic performance may suffer.

FieldTurf, the world leader in artificial turf, has mastered the science of safety and performance by engineering a sports surface that caters to ideal levels of impact absorption, rapid deceleration and energy restitution without the need for a shock pad. For the artificial turf industry, those ideal levels are known as MSP – Maximum Safety and Performance. MSP, measured as a field's G-Max rating, is a quantifiable indication of the field's degree of hardness and ability to absorb impact.



## G-Max Explained

The American Society for Testing and Materials (ASTM) published the test standard ASTM F-355 in the 1970's, which describes how the shock attenuation of sports surfaces should be measured. Measured are the "g" forces (gravitational units) present during impact of a cylindrical missile weighing 20 lbs. dropped 24 inches. The industry term for this measurement is called "G-Max", which is the measurement of the maximum number of "g's" of shock absorbed during impact of the weighted missile on the surface.

"According to historical data, the value of 200g is considered to be a maximum threshold to provide an acceptable level of protection to users." - ASTM Standard Specification for Shock-Absorbing Properties of North American Football Field Playing Systems as Measured in the Field".

## MSP Standards for Safety and Performance

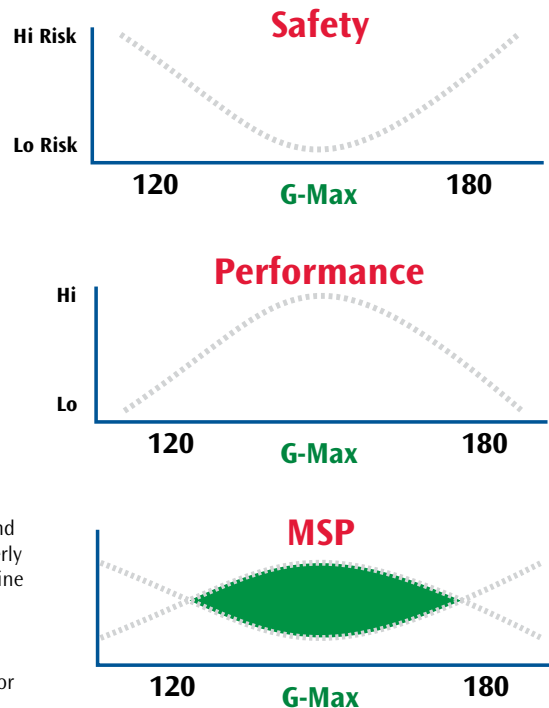
MSP, as a safe surface concept, refers to the ideal degree of hardness for your sports field, where both safety and performance are maximized. By incorporating the use of G-Max as a means of measurement, MSP refers to G-Max values in between the range of 120-180.

A field that meets MSP, provides shock absorbency that safeguards the athlete from excessive impact related force and will therefore help to reduce injuries. At the same time, athletes playing on a field that meets MSP will experience energy restitution that will keep them fresh and focused and avoid premature tiring and injuries caused by exhaustion.

A G-max value above 180, typical of an overly hard surface, represents a greater degree of energy that can be absorbed by the athlete during a collision with the surface. G-Max values below 120 represent an overly soft surface that usually increases the likelihood for infill migration. Infill migration, as a field hazard, often leads to the bottoming of the surface. With insufficient infill in place to protect the athlete at the point of impact, the risk of injury experienced on the field can increase.

The performance values of an artificial turf field can also be understood as a reflection of the field's G-Max rating. An overly soft surface, represented by a G-Max rating below 120, may not provide enough energy return to the athlete. As a result, the athlete can expend unnecessary amounts of energy that could ultimately lead to premature exhaustion. An overly hard field, with a G-Max rating above 180, may also negatively impact performance, as routine playability can lead to excessive energy returned to the athlete's joints and muscles. This performance hazard introduces the risk for severe and potentially career ending injuries.

In order for athletes to receive the best of both worlds, with a field that is neither too soft nor too hard, the field must meet the MSP standards for G-Max. MSP calls for fields to have an average G-Max rating within the 120-180 range. By meeting MSP, athletes can be sure that the surface will provide them with maximum safety and performance. All properly maintained FieldTurf fields conform to MSP standards in providing maximum shock absorbency and energy restitution, helping those who play on FieldTurf to stay safer and more energized throughout the course of the game.



Turf System	Typical G-Max Range
Muddy Grass	50-80
Grass with high level of organics	80-120
Newly installed all-rubber artificial turf with 19mm rubber pad	100-115
Newly installed all-rubber artificial turf	110-130
Heavily used all-rubber artificial turf with 19mm rubber pad	115-135
Well maintained grass with sand-bed system	120-180
Properly maintained FieldTurf	120-180
Heavily used all-rubber artificial turf without pad on gravel base where the rubber had displaced with use	130-260



\*Elevated G-Max readings are found on these systems at high use areas where the rubber had displaced with use.

**The All-Rubber System**

Using the analogy of running on the beach, an all-rubber system can be compared to running in the loose and tiring soft sand, whereas FieldTurf's sand and cryogenic rubber system can be compared to running along the firm shore line.

As a result, athletes on FieldTurf tend to remain more energized over the course of a game or practice. Sand has become so important in reducing field softness that most professional and collegiate sports teams implement a sand-bed into their natural grass systems in order to increase energy restitution levels.

**All-Rubber Infill Migration**

The absence of sand combined with the use of lightweight ambient rubber increases the likelihood for infill migration. With only approximately 3 pounds of infill per square foot (versus the 10 pounds of infill per square foot of FieldTurf) excessive infill migration in all-rubber systems can result in only a thin layer of rubber remaining to protect the athlete from the concrete or gravel base.



All-rubber infill has migrated towards the extremities of the field.

**The All-Rubber Risk**

With inconsistent infill depths and G-Max ratings on all-rubber fields, a player's safety may vary throughout the course of the field. Are you prepared to take that risk?

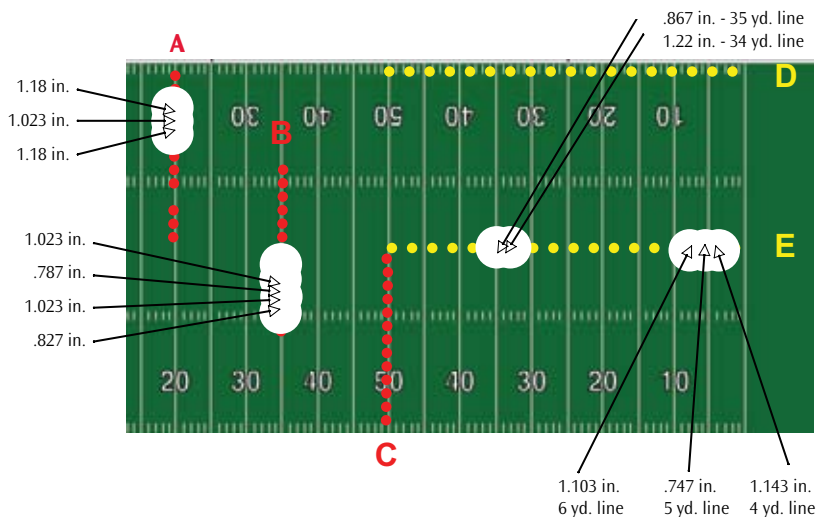
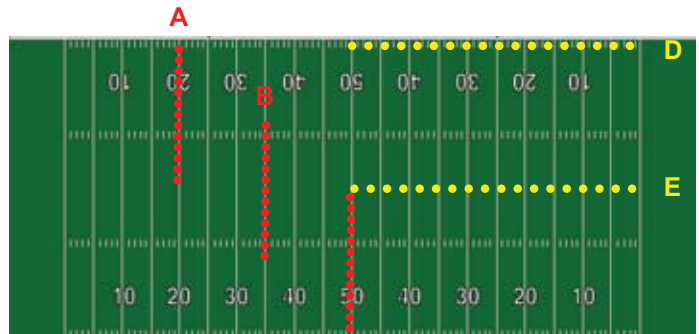
**Don't Be Fooled by Averages**

Testing has shown a variance of infill depth ranging from 0.6" to 1.75" on the same field - with a G-Max variance ranging from 103 (dangerously soft) to 257 (dangerously high). Although the field test average was 162, hiding behind such averages ignores the dangers of a field that it is both too soft and too hard depending upon where you land.

**All-Rubber Displacement Test**

This test of a typical all-rubber field (see diagrams) shows measurements of infill taken at 270 sites (A, B, C) each 1' apart, along the width of the field and 100 sites (D, E) each 3' apart, along the length of the field. This quickly demonstrates the effects of loose, all-rubber systems and infill migration. The inconsistent infill depths and G-Max ratings translate into varying degrees of shock absorbency. With just a small amount of infill migration the G-Max levels change dramatically - to a high of 269.

- 270 TOTAL SITES - Each 1' = A 90 / B 90 / C 90
- 100 TOTAL SITES - Each 3' = D 50 / E 50



For years, Astroplay, the leading maker of all-rubber systems, was well aware of the dangers and insisted that all-rubber fields need a pad.

**“A proven, reliable shock pad is the only way to control impact levels on turf over time!” - Astroplay marketing material**

“I have seen fields where rubber has migrated so severely from one area to another so that you have a lot more rubber in some areas, and not near enough rubber in other areas. That rubber infill is the only thing protecting the players from the stone base. So we always put a pad under the field.”  
**- Bob McKeiver - 8 year Astroplay Sales Representative**

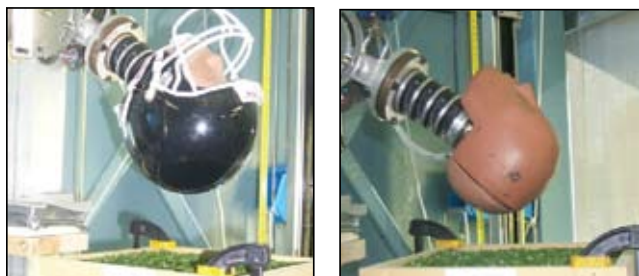
“When we’d go to the actual site visits and see the fields, we’d notice that we had a lot of displacement of the rubber from foot traffic, gym classes or marching bands, causing the rubber to go to the outside of the field.”  
**- Jim Knazek - 15 year Astroplay Regional Manager**

“Being with Astroturf for all those years, there was no field that we would ever consider putting down without a pad. With the stopping, starting and running at different angles, you get shifting and movement of the rubber. With that comes the lack of infill depth, and lack of infill depth raises your G-Max.”  
**- Chuck Bailey - 16 year Astroplay Regional Manager**

“At SRI I was their senior contract administrator. I did all of their bidding, specifying and contract management. We never sold fields without a pad.”  
**- Susan Oosten - 14 year Astroplay Sr. Contract Administrator**

**Comparing The Head Impact Response of FieldTurf vs. an All-Rubber Turf System**

To verify the safety of the FieldTurf system a laboratory test was conducted which measured the head response of FieldTurf compared to that of an all-rubber system. Drop tests were done from various heights, with impacts to the rear of an instrumental anthro-pomorphic manikin headform. The greatest difference was observed at the lower drop heights. Peak headform acceleration was recorded for both helmeted and bare head hits. In helmeted tests, FieldTurf showed the lowest headform G-Max. In bare head tests, FieldTurf showed the lowest headform peak acceleration G-Max.



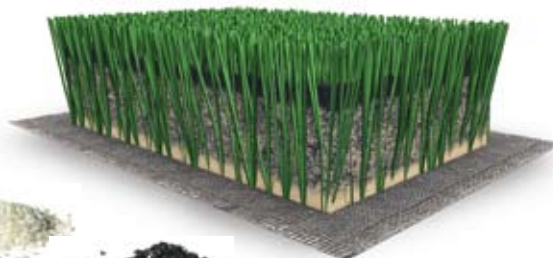
**All-Rubber Systems Need a Pad**

With a history of dangerous infill migration and the tendency to produce potentially unsafe G-Max ratings, it has become clear that soft and loose all-rubber systems require additional shock pad support in order to protect the athlete from the concrete or gravel base.

**With FieldTurf, Our Infill IS the Pad**

In contrast to the all-rubber system, FieldTurf’s patented silica sand and cryogenic rubber infill system satisfies the requirements of MSP without the need for a subsurface pad. The immense weight (560,000 lbs more infill than the average all-rubber infilled field) and high quality composition of the infill provides for proper safety, shock absorption, energy restitution and stability.

**The FieldTurf Engineered System**



Silica Sand  
 Cryogenic Rubber



**So what happened to the pad? It was eliminated to reduce costs. Don’t make the dangerous mistake of choosing low price over safety! Make sure you demand a pad.**

*Studies prove all-rubber systems need a pad. Get the facts. Ask for our detailed brochure and DVD about MSP. Send your requests to: [msp@fieldturf.com](mailto:msp@fieldturf.com)*