WHITEPAPER

PLAYGROUND SAFETY AND STATIC ELECTRICITY:

What's Safe and What Isn't?

PLAYGROUND GRASS™

by ForeverLawn®

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INTRODUCTION

Playgrounds offer an ideal outlet for a child's boundless energy. Kids get to happily climb, jump, and run around while guardians keep watch nearby.

The experience is great—until an injury occurs. For any onlooker who has ever witnessed a child's joy turn to pain, it's a terrible moment. Whether from a fall or the scare of an electric shock, negative moments on the playground are something everyone wants to avoid.

For playground designers, safety must be a top priority. It's important to create spaces that satisfy a child's exploratory energy, yet offer the most advanced safety measures.

Issues like static electric charging need to be addressed and minimized early on in the planning phase, as static electricity has always been a problem on playgrounds. Think back to when you played on the playground as a kid. Remember those dreaded shocks after getting off the slide? For most children, shocks from static electricity on the playground aren't painful, just uncomfortable. But for children with special medical devices such as cochlear implants, static shocks can become a painful and expensive problem.

Playground architects can work to design smarter play experiences for children; spaces that offer safer, more inclusive playground surfaces for any child.

This white paper will explore the importance of safety on playgrounds, the effects of static electricity on playground safety, and solutions for controlling static electricity on playgrounds.

WHAT IS STATIC ELECTRICITY?

All matter is built from atoms, which can be positively or negatively charged. As people move around surfaces and objects, electrical charges build up. Most of the time, these charges remain neutral. If the charges become uneven, that's when a "shock" from static electricity may occur.

Certain materials are more prone to the build up of electrical charges. Plastic, for example, is an insulating material that becomes charged by friction.

STATIC ELECTRICITY ON PLAYGROUND SURFACES

Stand around a playground tube slide for a few minutes, and you'll see static electricity in action. Every few kids who emerge from the tunnel will be sporting frizzy hair that's reaching for the sky. While their look is somewhat comical, the "shock" and "zap" of static electricity is an issue that needs addressed.

The most common means of a person or an object acquiring an electrical charge is through the process of "triboelectric" charging. Triboelectricity is often the result of friction, but it can also occur with simple contact followed by separation in many substances.

Material selection makes a significant difference in the amount of static electricity you may encounter on a playground. Slides, for example, are highly prone to static charging and leave users vulnerable to getting shocked.

Artificial grass, a popular choice for playground surfaces, is another material to consider. On some synthetic turf surfaces, triboelectric charges can build up. However, forward-thinking manufacturers are starting to address these concerns and engineer antistatic products to keep children safe.

The frequency of static electricity on playground surfaces also depends on several factors, such as weather conditions and type of clothing worn. In drier weather, for example, it's more likely to collect electrons as you move around, building up charges that cling to your body and lead to that "zap" moment. When it's humid outside, the severity and frequency of static shock lowers to a degree.

CAN STATIC CHARGE BE HARMFUL?

Since the human body is a conductor of electricity, charges will accumulate on the body if in contact with an electrically insulating surface. If the person with a static charge approaches or touches a conductive object such as a grounded metal rail, a discharge can occur. This "shock" is known as electrostatic discharge, or ESD.

Some people are more sensitive to shocks than others. For most people, the threshold for feeling shocks is in the range of 2,000-4,000 volts. If the voltage nears 10,000 volts the spark will be heard, and light from the spark may be observed. Above 15,000 volts, the shock is painful. Above 20,000 volts, the shock will be memorable and can result in a fall or other involuntary muscle retraction resulting in possible injury.

2,000 volts — Shocks can be felt

3,000 volts — Shocks are uncomfortable but not painful

10,000 volts — Shocks can be heard, and light from the spark may be observed

15,000 volts — Shocks are painful

20,000 volts — Shocks are memorable and can result in injury

WHY IS STATIC ELECTRICITY A CONCERN FOR PLAYGROUNDS?

The outside play experience is fundamental to a child's growth and development. Kids love to interact with their environment and each other.

But for some children, engaging in these activities is a challenge. More than 30,000 children in the U.S. have profound hearing loss that results in cochlear implants. These intricate electronic devices restore partial hearing so a child can learn to communicate. They are surgically implanted with an external portion by the ear and an internal portion that's placed under the skin.

Children with cochlear implants are dependent on their devices to receive any sound. Regular hearing aids are not effective for them, so the cochlear implant must be in place for them to communicate. And for these children, static electricity is a significant concern.

Static electricity is dangerous to any child with a cochlear implant. The sensitive electronics in the device are easily damaged or ruined by excessive static. The device's battery may short, a coil can get damaged, or the processor may fry, which is an extremely expensive part to replace.

When children with cochlear implants come to a playground, they're forced to make the difficult choice to remove their device as a safety precaution. Without their hearing capability, the child's playground experience is not as rewarding. They aren't able to interact with their peers or their environment.

As playground architects, it's important to find ways to embrace all children. Playgrounds can be designed to minimize static build up. The right playground surface makes a big difference for users, as well as slide selection, like in this case study where a 10,000-square-foot playground had to be reconfigured to reduce the frequency of static shock.

Creating safe playground spaces that offer inclusive play for all children is incredibly important. Playground planners should examine ways to control static electricity and be inviting to all kids, especially for those children who are dependent on cochlear implants to fully enjoy the playground experience.

Inclusive play allows children to feel included and empowered, regardless of their ability. While not every element needs to be accessible, it's important that the combination of play experiences offers something for each child.

SOLUTIONS FOR CONTROLLING STATIC ELECTRICITY

For more than 30 years, the synthetic turf industry has researched solutions for static on playgrounds. While static charging cannot typically be reduced to zero, it is possible to stay below 2,000 volts and eliminate the physical sensation of shocks.

Today, leading manufacturers like ForeverLawn® are incorporating fibers into the turf that minimize the build up of static electricity. Playground Grass™ Ultra with antistatic protection is the only patented antistatic synthetic turf that includes this revolutionary technology.

The patented technology in Playground Grass Ultra offers key benefits for playground designers (and it's been tested):

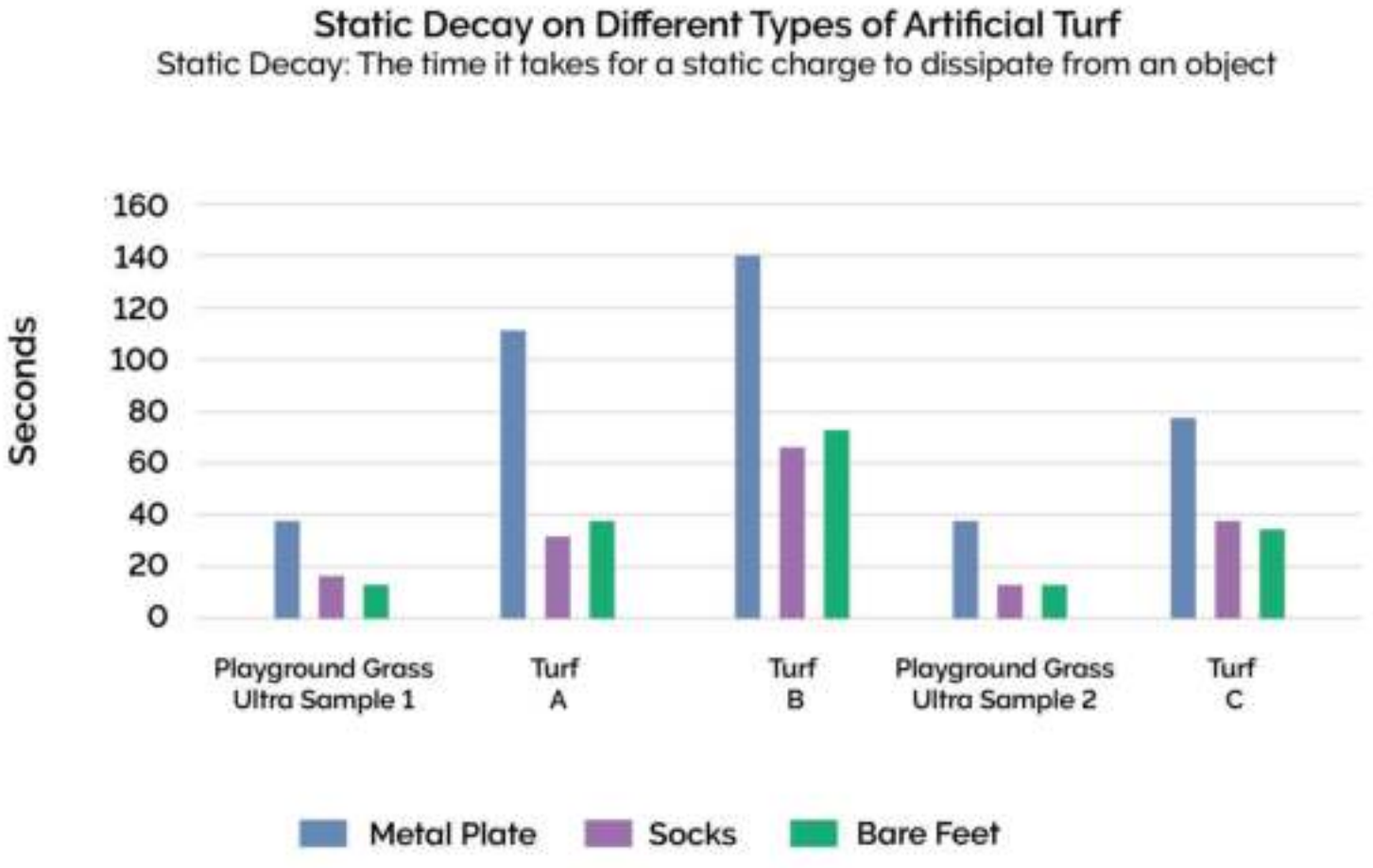
- Engineering to significantly target and reduce static generation.
- Special fibers to easily dissipate static that may occur.
- Low-maintenance turf with cushioned support.
- Inclusive playground surface that's safe for all kids.
- Specifications that exceed ADA minimum standards.
- Durable product for long-term, extensive use.

ADVANCED STATIC DISSIPATIVE TURF

The chart below shows the results of a test conducted on five different samples of artificial turf, including Playground Grass Ultra. The product performance of the artificial turf and its ability to dissipate static charge were evaluated.

The test measured static decay, which is the time it took for a static charge to dissipate from an object (in this test, a metal plate and a person). The decay time is evaluated by the seconds it took for the voltage to drop from 1000 volts to 100 volts.

As the results show, the decay time for the voltage to drop is significantly faster on the two samples of Playground Grass Ultra. The static mitigation was clearly the strongest in the Playground Grass Ultra.

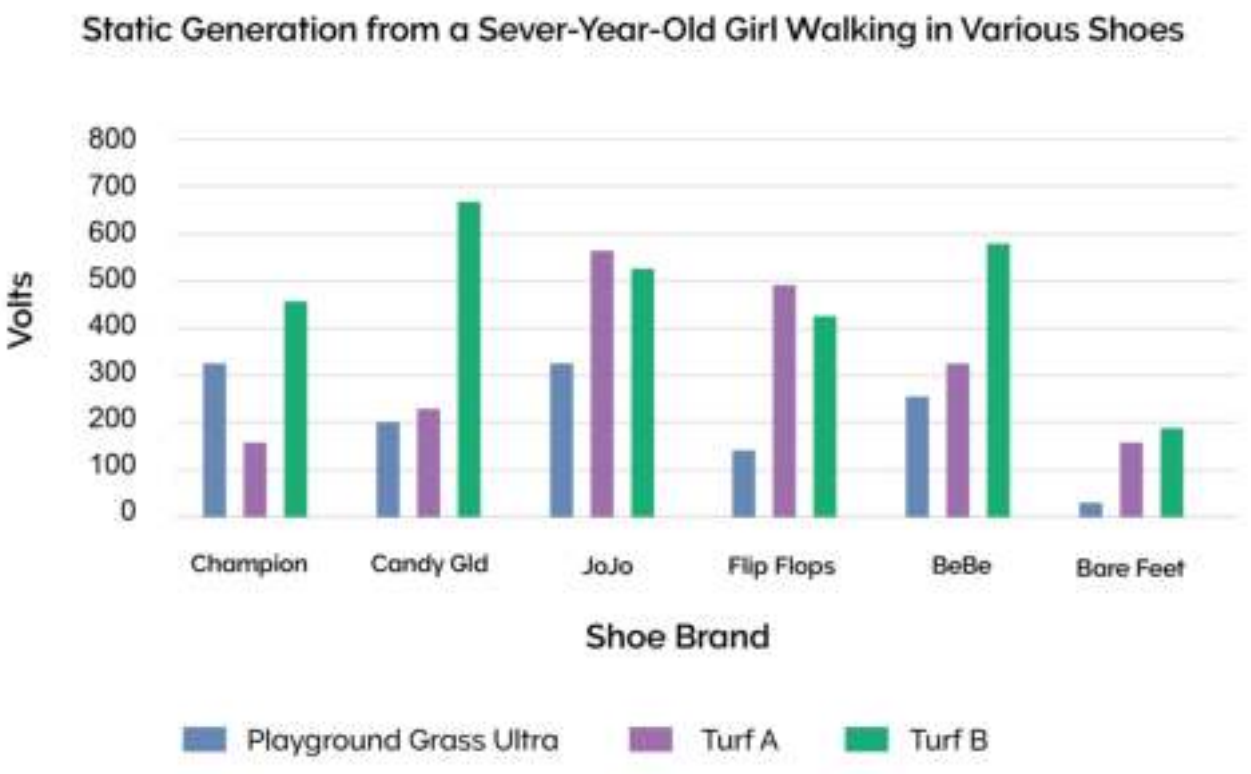


STATIC CONTROLLED SURFACE WITH PLAYGROUND GRASS ULTRA

The following tests evaluated the static generated by walking across various samples of artificial grass, including Playground Grass Ultra. The first chart shows the charge generated by a child (seven-year-old girl) and the second chart shows the charge generated by an adult. In both tests, participants wore a variety of footwear.

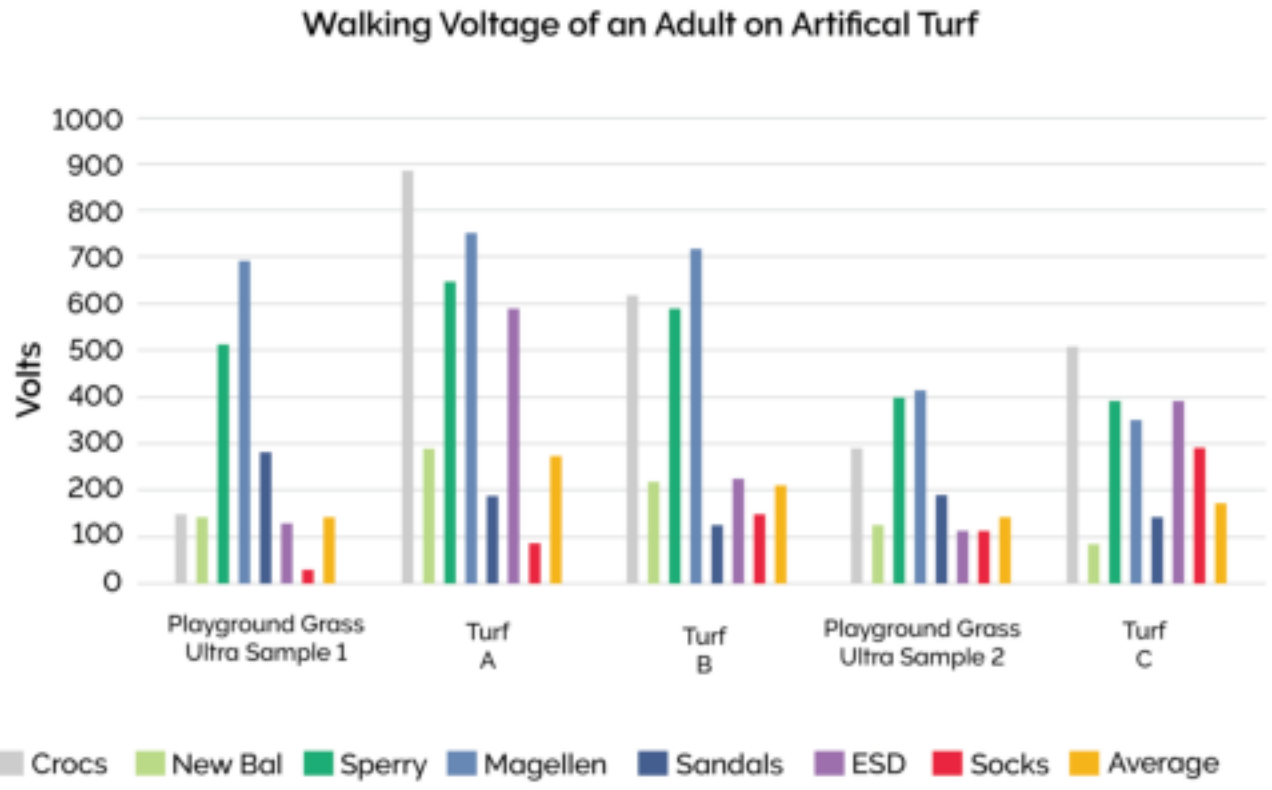
WALKING VOLTAGE FOR A SEVEN-YEAR-OLD GIRL

As shown in the test results below, there is a significant difference between the turf samples. Playground Grass Ultra had the lowest static generation of all the tests conducted. Its static dissipative qualities surpassed the other samples, making it the safest artificial grass surface for thechild to walk across.



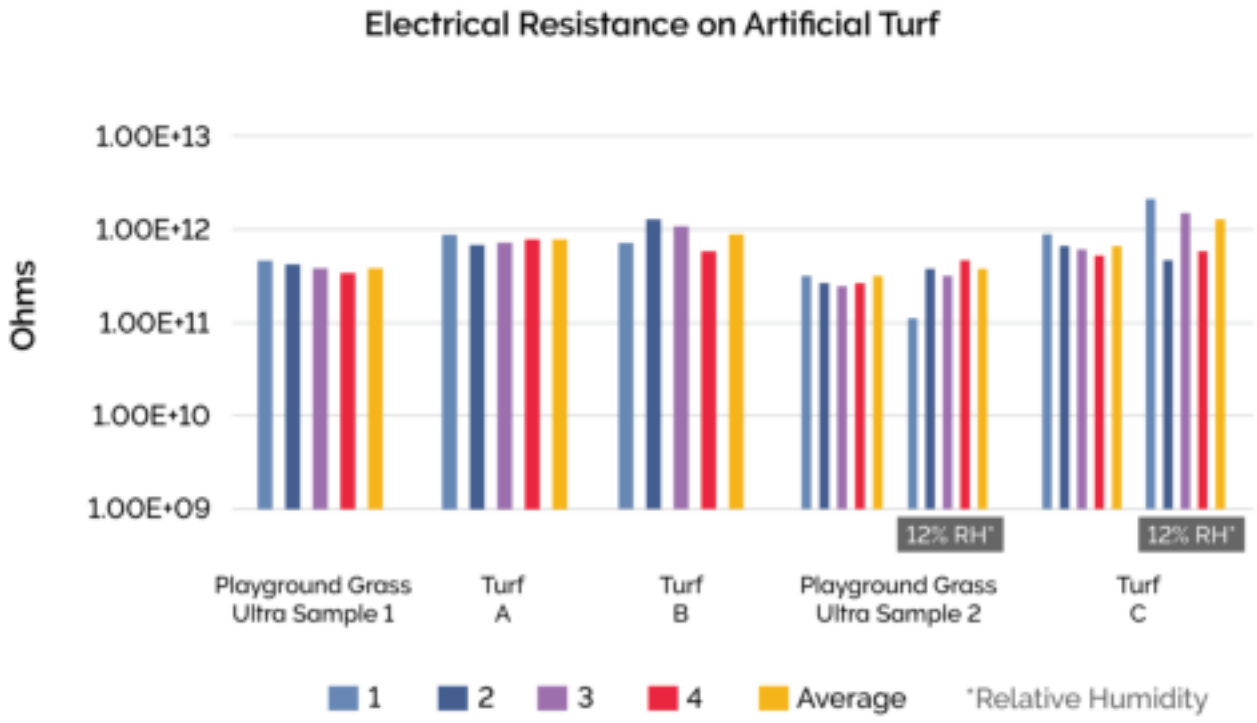
WALKING VOLTAGE FOR AN ADULT

The test below shows the final results of an adult's walking voltage on five samples of artificial grass. The columns are ranked in order of the turf samples with the lowest static generation. Playground Grass Ultra had the best results overall. Playground Grass Ultra was better able to control static, regardless of the shoe worn by the test participant.



TURF WITH BETTER ELECTRICAL RESISTANCE

The final test below examined electrical resistance between two points on artificial grass. The lowest point-to-point resistance is for Playground Grass Ultra. The static charge was able to dissipate more easily on these lower resistance surfaces. Playground Grass Ultra, which is designed for lower static charge generation, maintained the best electrical resistance of all the turf samples, even at various humidity levels (lower ohms is better).



EXPLORE PLAYGROUND GRASS ULTRA FOR A SAFE, INNOVATIVE PLAYGROUND SURFACE

Creating a safe and more inclusive playground is important for the communities you serve. Children should be able to play and explore until their hearts are content, without the fear of an excessive electric shock.

The patented technology in Playground Grass Ultra by ForeverLawn not only reduces static electricity generation, but the special fibers work to dissipate any static that does occur. It's an advanced playground solution with tested and proven antistatic capability.

Take a closer look at the product and architectural specs of Playground Grass Ultra for yourself, or request a consultation to learn more for your next playground project.

REFERENCES

- "Cochlear Implants." *National Institute of Deafness and Other Communication Disorders*, U.S. Department of Health and Human Services, 15 June 2018. https://www.nidcd.nih.gov/health/cochlear-implants
- "Marshfield Playground Delayed Over Static Electricity." *The Patriot Ledger*, 5 Aug. 2019. https://www.patriotledger.com/article/20100805/NEWS/308059598