SYNTHETIC TURF PITCHES AND MICROPLASTIC POLLUTION

Information Paper & Sport NI Position Statement

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1. BACKGROUND

In 2017 the European Commission asked the European Chemicals Agency (ECHA) to research the impact of intentionally added microplastics in a range of industries and applications. In 2019, ECHA published a report which included a recommendation of a broad restriction on the use of intentionally added microplastics with the aim of reducing environmental pollution caused by microplastics.

In 2022, the European Commission released a statement which recommended the introduction of a ban on the future sale of 'intentionally added microplastics' onto the European market. On 25th September 2023, the European Commission took a major step to protect the environment by adopting measures that restrict microplastics intentionally added to products under the EU chemical legislation REACH. The new rules will prohibit the sale of microplastics, and of products to which microplastics have been added.

The new rules imply a ban on the sale of all 'intentionally added microplastics' following an eight-year transition period. The rules were adopted on 25th September 2023, with the transition period ending October 2031.

2. WHAT ARE MICROPLASTICS?

Microplastics are defined as non-biodegradable polymeric (rubber or plastic) materials that are 5mm or less in size. Microplastics may be intentionally added to products (e.g., micro-beads in cosmetics) or unintentionally occur through wear and tear (e.g., micro-fibres from clothing) or through the breakdown of discarded polymeric products. Polymeric infills (which includes rubber infill used on 3rd Generation Synthetic Surfaces) meets the definition of an intentionally added microplastic.

3. WHAT IS A 3RD GENERATION SURFACE?

A 3rd Generation surface has a carpet pile made up of individual synthetic fibres which are typically between 40 mm and 60 mm in length. This is much longer than other forms of artificial grass that have pile lengths of between 10 mm and 25 mm, depending on intended use (i.e., sport to be played on the surface). To help provide the desired playing characteristics and to aid player comfort and protection, the spacing of the stitches forming a 3rd Generation carpet pile is quite open. This is to allow infill to be placed between the pile fibres.

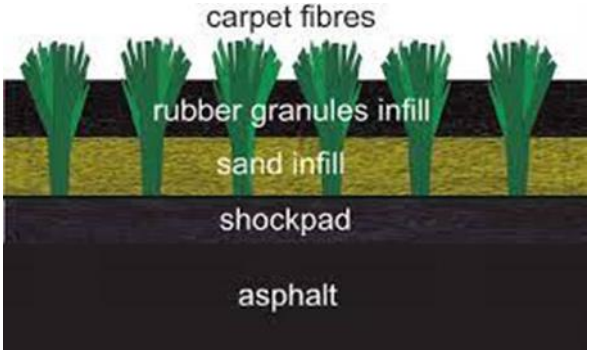

Figure 1

Figure 1 shows the layer construction used in 3rd Generation synthetic surfaces. The 'top layer' of infill used in 3rd Generation pitches is rubber granules (commonly referred to as rubber infill). This is what gives a pitch the desired playing characteristics. Traditionally rubber infill was sourced from recycled tyres. 3rd Generation synthetic pitches typically have a lifespan of 10-12 years, throughout which time the surface should be regularly brushed to redistribute and evenly spread rubber infill. Across the lifecycle of the pitch, it may also be a requirement to 'top-up' the rubber infill to maintain the performance characteristics of the surface.

4. HOW DO RUBBER INFILLS CAUSE POLLUTION?

The Sport and Play Construction Association (SAPCA) has indicated the potential environmental threat caused by rubber infill was first identified in Scandinavia. SAPCA claim that studies showed over 900kg of infill could be lost from a single pitch each year. However, 50% of this infill loss was due to the repeated clearance and disposal of snow containing infill during the Scandinavian winter months. In the UK, SAPCA claim studies have shown infill migration to be much less – around 500kg per pitch per year[1].

Rubber infill migrates from 3rd Generation synthetic pitches in several ways. These include:

- On maintenance equipment, especially brushes.
- Migration to side of pitches and beyond, following use and maintenance.
- On players' clothing and footwear.
- Surface water run-off.

5. CAN ANYTHING BE DONE TO REDUCE RUBBER INFILL POLLUTION?

Independent studies[2] have shown that through good field design, operation and maintenance, infill migration from an artificial grass pitch can be reduced by up to 98% from typical worst-case situations. BSI Standards[3], working with the European Committee for Standardisation (CEN), have developed a Technical Report describing the procedures that should be used to control infill migration. These include:

- Fitting containment barriers on a pitch's perimeter fencing.
- Installing decontamination grates and boot cleaning brushes at all player and vehicle entrance gates.
- Ensuring all stormwater drains around a pitch have suitable microfilters to capture any infill being carried by surface run-off, etc.
- Keeping a dedicated maintenance brush within the boundaries of the pitch, so it cannot carry infill into the surrounding environment.

[1] Frequently Asked Questions – Use of Infill Materials in 3G artificial Grass Pitches. Sport and Play Construction Association (SAPCA), April 2023
[2] Determining the Effectiveness of Risk Management Measures to Minimize Infill Migration from Synthetic Turf Sports Fields. Magnusson & Mácsik, European Synthetic Turf Council (ESTC), August 2020
[3] Surfaces for Sports Areas — Synthetic Turf Sports Facilities — Guidance on How to Minimize Infill Dispersion into the Environment, BS PD CEN/TR 17519, July 2020

- Thoroughly removing any infill from maintenance tractors, etc. before they leave the pitch.

Further and more detailed information can be found on guidance published by SAPCA and the European Synthetic Turf Council (ESTC). FIFA, World Rugby, and the International Hockey Federation (FIH) have all included the recommendations of CEN into their certification programmes for artificial grass pitches. Contractors building synthetic pitches that require certification should therefore include the measures within their designs.

6. COST OF IMPLEMENTING INFILL CONTAINMENT MEASURES?

The cost of the necessary containment measures will become lower as the market evolves, and more companies develop products specifically for this application. SAPCA research[4] indicates measures are typically adding up to £20,000 plus VAT to the cost of a new full-size (soccer) pitch. As many of these features should function for at least 20 years, their life cycle costs are not considered to be disproportionate for the environmental benefits they bring.

7. IMPACT ON 3RD GENERATION SYNTHETIC PITCHES?

The rules under the EU chemical legislation REACH are now in place, which means the 8-year transition period has already begun. The new rules do not prevent the continued use of micro-plastic materials for synthetic surfaces, nor does it prevent the construction of new synthetic surfaces with rubber crumb infill before 2031. However, at the end of the transition period, it will not be possible to source rubber infills within the European Union, which will make maintenance of synthetic playing surfaces a significant challenge.

8. ARE THERE ANY ALTERNATIVE INFILL PRODUCTS?

When the eight-year transition period has ended only natural and fully biodegradable infill materials will be permitted for use in synthetic surfaces. Consequently, it is expected that synthetic pitch systems will change significantly in the coming years and costs of organic materials are likely to fluctuate in the short term, as commercial organisations compete for a share of the market.

Systems have already been developed using organic infill materials, including granulated cork, coconut fibre, olive stone husks, bark, sand, and corn kernels. These systems have been tested and are already in use across Europe, with the first organic infill pitch system on the island of Ireland expected to be installed in 2023/2024.

However, it is important to note that organic infill materials have yet to prove their durability and suitability for all UK/Irish weather conditions. Lifecycle costs are currently unclear, as is the ability to deliver the required

[4] Frequently Asked Questions – Use of Infill Materials in 3G artificial Grass Pitches. Sport and Play Construction Association (SAPCA), April 2023

performance standards over a longer period. It is only when these systems have been installed, and in use for longer periods, will we start to understand the advantages and disadvantages.

9. CAN ORGANIC INFILLS SIMPLY REPLACE RUBBER INFILLS?

This depends on multiple factors, including type of existing carpet, condition of existing carpet, if a shockpad is present, condition and quality of shockpad, and if the chosen contractor has equipment to extract? In theory, it may be possible to replace rubber infills with organic infills on some surfaces, but each surface needs to be assessed individually, and there is likely to be existing pitches where this process is simply not an option.

Synthetic turf systems are designed to provide playing and safety properties required for sport. Organic infills generally provide less energy absorption to players falling onto the surface than rubber infills, meaning the pitch systems in which they are used must include a shockpad underlayer. If an existing pitch does not have a shockpad (of suitable quality and performance) changing from a rubber to an organic infill is likely to result in an unsatisfactory and potentially unsafe playing surface.

10. WHAT ABOUT 4TH GENERATION SYNTHETIC PITCHES?

Responding to environmental concerns, a 4th Generation of artificial grass surfaces are being developed. These are artificial grass that either have no infill (non-filled) or are only partly filled with sand. 4th Generation surfaces have a much denser primary pile, and often a secondary pile or thatch zone, both of which are designed to ensure the primary pile is supported and remains standing upright.

To date, testing has shown that 4th Generation surfaces are not able to satisfy the FIFA criteria for artificial grass football surfaces and the World Rugby criteria for artificial grass rugby surfaces. This is primarily due to the surfaces' inability to satisfy the criteria for skin/surface friction, meaning there is an increased risk of a player suffering from a carpet burn when they slide on the surface. Low foot grip has also been found to be problem with some 4G pitch systems.

11. HOW DOES THIS POTENTIAL BAN AFFECT NORTHERN IRELAND?

Under the Windsor Frameowrk, Northern Ireland will continue to follow rules recently added to the EU Chemical REACH legislation. REACH is the EU regulation governing the manufacture and import of chemical substances. REACH is an acronym for the "registration, evaluation and authorization of chemicals" and has been in force in all EU Member States since 2007.

This means owners/operators of 3rd Generation surfaces in Northern Ireland will have to comply with EU rules relating to intentionally added

microplastics. Northern Ireland, along with all EU Member States, has now entered an 8-year transition period (ending September 2031).

Sport NI's Active Places facilities database shows the scale of the challenge posed by EU rules in Northern Ireland. There are over 171* 3rd Generation synthetic playing pitches (of various sizes) located throughout Northern Ireland. Table 1 shows the breakdown of 3rd Generation pitches in Northern Ireland by ownership, and Table 2 shows the spread of the 171* 3rd Generation pitches by District Council area.

Table 1: Distribution of 3G by ownership*

Ownership:	Number of 3G Pitches:
District Council owned sites:	78
Education owned sites:	26
Club owned sites:	33
Privately owned sites:	16
Community owned sites:	18
TOTAL	**171**

Table 2: Distribution of 3G by Council Area*

Council Area:	Number of 3G Pitches:
Antrim & Newtownabbey	14
Ards & North Down	14
Armagh, Banbridge & Craigavon	15
Belfast City	67
Causeway Coast & Glens	8
Derry City & Strabane	10
Fermanagh & Omagh	8
Lisburn City & Castlereagh	10
Mid & East Antrim	4
Mid Ulster	14
Newry, Mourne & Down	7
TOTAL	**171**

**Data from Sport NI'S Active Places Database. Information accurate as of 2016 – figures outlined may vary depending on development since Active Places database was last updated.*

Sport NI's data reflects the challenge, in terms of retrofitting infill containment measures to existing pitches, but also replacing shockpads, carpets, and rubber infills with a suitable alternative when each of these existing pitches reach the end of their natural lifecycle. It is difficult to estimate costs at this stage because every pitch will have a unique specification and the costs of organic infills are higher than rubber infill (for now).

12. HOW DOES THIS POTENTIAL BAN AFFECT THE REST OF THE UK?

The United Kingdom has left the European Union, and therefore the EU rules will not have a direct effect on England, Scotland, and Wales. However, this does not include Northern Ireland.

The UK government has not yet announced plans for measures to limit the sale or use of rubber infills in synthetic turf. UK REACH will carry out an assessment to determine whether the restriction measures are needed in the UK. At the time of writing, this work is ongoing, but it is unlikely that the UK will mirror the transition timescales introduced by the European Union. However, the UK (lead by SAPCA – Sport and Play Construction Association) has developed infill containment measures on new build pitches as best practice along with advocating improved maintenance measures (for all pitches) to ensure that infill does not leave the confines of the pitch facility. A summary of the measures has been provided at Section 5.

13. SPORT NI RECOMMNEDATIONS?

EU rules on micro-plastics are now in place, and all European Member States (and Northern Ireland) have entered an eight-year transition period (ending September 2031). The rules do not prevent the continued use of micro-plastic materials for synthetic surfaces, nor does it prevent the construction of new synthetic surfaces with rubber crumb infill before 2031 – but it will make the maintenance of these pitches difficult after the transition period.

Organisations who own or operate existing synthetic surfaces with rubber infill will need to plan carefully for the end of lifecycle or maintenance 'top-up', should either of those dates fall outside of the transition period. After the eight-year transition, there is no ban on the use of rubber infill, but it will be impossible to source rubber infill from within the EU member states.

In the short to medium term, organisations with aspirations of developing new 3rd Generation pitches, must carefully consider the likely challenges that will arise after the transition period, as this is likely to come before the 10–12-year lifecycle of a new 3rd Generation surface. Organisations developing new surfaces may wish to consider the use of organic infills, and those with existing surfaces should consider the adoption of containment measures, as this is a responsible approach to prevent the migration of microplastics. Studies from around Europe show containment measures can reduce infill loss by 98%.

14. SPORT NI POSITION STATEMENT

Synthetic surfaces are recognised as a durable, safe, year-round playing surfaces, able to withstand intensive use. These pitches are used primarily by our 'larger' sports including Association Football, Gaelic Games, Rugby, and Hockey. They are also an important community resource enabling more people to benefit from participation in sport and physical activity.

A properly maintained synthetic surface can sustain up to 80 hours of use a week, providing an average of around 1,400 playing opportunities. This compares favourably to a good quality natural turf pitch, which can sustain just six/seven hours a week, accommodating an average of around 100 playing opportunities. This means many people can engage in sport and physical activity regardless of the weather when otherwise matches/training would be cancelled.

However, concerns have been raised about the environmental impact of these pitches. Specifically, pollution resulting from the migration of micro-plastics (i.e., rubber crumb infill). Sport Northern Ireland (Sport NI) understand these concerns and we are taking them very seriously.

In September 2023 the European Commission completed the adoption of the EU REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) rules on the sale of intentionally added microplastics onto the European market, which includes rubber infill for synthetic surfaces.

The Commission has confirmed an eight-year transition period before the new restriction becomes effective (ending October 2031). At this point, you will no longer be able to purchase rubber crumb within the European Union (EU). The ruling does not prevent the continued use of this material for synthetic surfaces, nor does it prevent the construction of new pitches with rubber crumb infill before 2031 – but it will make the maintenance of these pitches significantly challenging once the transition period has ended.

The transition period is important because it allows synthetic surfaces (with rubber infill) that are in widespread use by communities across Europe, to continue to be used and maintained until they reach their end-of-life. Replacement surfaces are very expensive, and many organisations could not afford to do so before the end of the transition.

As a result of the Windsor Framework, Northern Ireland remains subject to these EU rules. Sport NI is committed to these rules, and we endeavour to work with our partners and stakeholders from across Europe and within the United Kingdom to share information and guidance relevant to the sector. Along with our counterparts in England, Scotland, Wales, and Republic of Ireland, we are also committed to exploring alternative artificial pitch systems and more sustainable infill products. However, some of the alternatives to rubber crumb are relatively new to the market, and while some data already exists, there is still much to learn about their performance, durability, availability, lifecycle cost, and importantly the impact on player experience. We are entering a period where decisions must be made and it's important that data exists to help owners of synthetic surfaces make the right choices for their pitch.

Sport NI acknowledge the challenge of balancing the many benefits that come from the use of synthetic surfaces with environmental sustainability. We will continue to work with partners across Europe and within the UK to

research and reduce the spread of microplastics into the environment. More information will be published as discussions progress and information is shared.

Information contained within accurate as of 21st November 2023

EU Microplastics Ban – Irish FA Statement

The EU has adopted a comprehensive ban on the sale of 'intentionally added microplastics' including rubber granular infill in synthetic football pitches.

Artificial grass pitches (AGPs) provide a high-quality surface that are an integral part of modern community sport. AGPs are recognised as durable, safe, year-round playing surfaces, able to withstand intensive use in all kinds of weather. AGPs are widely used in football and are considered a good alternative to natural grass pitches in certain situations. According to FIFA a properly maintained AGP can sustain up to 60 hours of use a week. This compares favourably to a good quality grass pitch, which according to FIFA, can only sustain 6 hours per week. The benefit of AGPs is that they afford people to engage in sport and physical activity regardless of the weather when otherwise matches would be unplayable. 3G AGPs enable more people to experience the benefits of being active, such as improved physical health and mental wellbeing.

AGPs are used for playing many different sports, including football, hockey and rugby and provide spaces for people to come together, helping communities connect. It is critical that our sports facilities are flexible, durable and sustainable to reflect the real everyday requirements of all users and meet societal demands responsibly.

When considering the design and installation of a new AGP carpet, applicants should engage with a recognised synthetic turf consultant/ specialist for advice and may wish to access best practice synthetic turf sports pitch/ Multi Use Games Area (MUGA) design guidance available on FIFA's website; https://digitalhub.fifa.com/m/235e3d6a9a502840/original/Code-of-Practice-for-the-Design-and-Construction-of-Football-Turf-Fields-2023-edition.pdf and the Sports and Play Construction Association's (SAPCA) website; https://sapca.org.uk/guide/codes-of-practice/. Sport NI has published

an Information and Position Paper on their website in respect of the microplastics ban; http://www.sportni.net/wp-content/uploads/2023/11/Microplastics-Information-Paper-November-2023.pdf.

The challenge faced is trying to balance the health and well-being benefits that come from the use of AGPs with environmental sustainability factors. In recent times, concerns have been raised about the environmental impact of these pitches. These have mostly related to the fibre-loss of microplastics and, in the case of third generation (3G) pitches, the presence of rubber infill, which is also a microplastic.

In September 2023 the EU adopted a comprehensive ban on the sale of 'intentionally added microplastics' onto the European market, including the use of granular infill material used on artificial sport surfaces. The ban refers to intentionally added microplastic infill and will have an eight-year transition period. According to the Information and Position Paper on the Microplastics Ban published by Sport NI, although part of the United Kingdom and under the Windsor Framework, NI will continue to follow rules added to the EU Chemical REACH legislation. REACH is the EU regulation governing the manufacture and import of chemical substances. REACH is an acronym for the 'registration, evaluation and authorisation of chemicals' and has been in force in all EU Member States since 2007. This means owners/operators of 3rd Generation surfaces in Northern Ireland will have to comply with EU rules relating to intentionally added microplastics. Northern Ireland, along with all EU Member States, has now entered the 8-year transition period (ending September 2031).

It should be noted that the ban is only for the sale of polymeric infill materials. The ruling does not prevent the continued use of this material for AGPs, nor does it prevent the construction of new pitches with rubber crumb infill before 2031, but it may make the maintenance of these pitches after this time difficult. The eight-year transition period is important because it allows the 3G AGPs that are in widespread use by communities across Europe, to continue to be used and maintained until they reach their end-of-life. Replacement 3G surfaces are very expensive, and many pitch owners and operators would simply be unable to afford to do so before the end of the transition.

Pitch systems have already been developed using organic infill materials, including granulated cork, coconut fibre, olive stone husks, bark, sand and corn kernels. However, it is important to note that there are currently no widely available alternative infill products with proven durability on the market, that are as effective as rubber crumb and are suitable for all UK weather conditions and deliver the required football performance standards. Many of the alternatives to rubber crumb are new to the UK market, and little is known about their performance, durability, availability, lifecycle cost and importantly the impact on player experience.

Early research has shown that the organic infill products are not as durable as the polymeric infill. AGP owners may need to top up with more organic infill compared with the amount of polymeric infill they current use (approximately 15% more infill required) and may need to invest in more advanced AGP maintenance equipment which is significantly more expensive than current AGP maintenance equipment. Therefore, further research is required to ascertain the durability of organic infill products in the UK climate and suitability and performance capabilities on AGPs that are used for the elite game. Organic infills generally provide less energy absorption to players falling onto the surface than rubber infills, meaning the pitch systems in which they are used must include a shockpad underlayer.

Until there is a clearer understanding of alternative infill products, the adoption of containment measures is an important and responsible approach to prevent the migration of microplastics. Studies from around Europe show good design can reduce infill loss by 98%. This includes introducing measures and practices that minimise the risk of microplastic migration into drainage systems and local water courses. This can include practices such as not overfilling the pitch to prevent excessive levels of microplastic infill, ensuring that infill products are stored in secure locations, ensuring that infill installation equipment and carpet brushes are thoroughly cleaned before leaving the pitch, installing low-level containment barriers around the spectator perimeter fencing and boot cleaning stations for boots post-match. Full details of best practice can be found in the British Standards publication BS PD CEN/TR 17519: Surfaces for sports areas - Synthetic turf sports facilities - Guidance on how to minimize infill dispersion into the environment and on the website of the European Synthetic Turf Council (Knowledge Centre - Infill - ESTC - EMEA Synthetic Turf Council).

We are entering a period where there will be choices for pitch owners and operators to make and it's important that data exists to help future 3G AGP owners/ operators make the right choice of pitch. There are no accurate figures available at present to confirm the total number of NI football AGPs that will be impacted by the ban.

In addition to the concerns about rubber infill, the potential for fibre debris to also become an environmental pollutant are also now being investigated. As synthetic turf surfaces age and weaken through use, the yarns marking up the playing surface will split and breakaway. If this fibre debris is not collected, they will be carried off the AGP and become another form of microplastic pollution. Specialist maintenance equipment is available that vacuum cleans the surface to collect the fibre debris. As this process is only effective when the surface is dry it is recommended that AGPs are deep cleaned biannually in the Spring and early autumn.

The Irish FA remains committed to supporting its member clubs through the transition period and to opening dialogue with 3G AGP key stakeholders including central and local Government to understand what the EU ban will mean for the existing stock of 3G football AGPs in NI and the timings for any legislative decisions.

More information will be published when more research data is made available to the Irish FA.

Information detailed above accurate as of 8 February 2024.