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RecyBEM's contribution to the RAC/SEAC Opinion on an Annex XV dossier proposing restrictions on intentionally added microplastics

Tyre and Environment

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Introduction of RecyBEM

RecyBEM association Tyre and Environment is the management company for the Dutch legislation on waste management for end of life tyres (Besluit beheer autobanden). In the Netherlands all used tyres from the aftermarket are collected by RecyBEM and processed in an environmentally-friendly way. As a result, we prevent scrap tyres from littering in the environment, we reduce the need for extraction of primary raw materials from nature and we reduce CO_2 emissions by doing so. RecyBEM is an initiative by the tyre producers to fulfil the obligations set out in the Dutch legislation on waste management for end of life tyres (ELT).

RecyBEM emphasizes the need for the reuse of tyres in the highest forms of recycling when it comes to the use of (raw) materials. We organize the collection and recycling of used car tyres from the replacement market in the Netherlands. In 2018 our collectors have collected a record number of 9.3 million car tyres. The used tyres are processed in an environmentally friendly way. RecyBEM realizes around 95% product and material reuse. With this results the Netherlands is a leading example in Europe. From 2004 until April 2019 the collection and recycling of 120 million used tyres in The Netherlands has reduced the ecological impact[1] with:

- - 337 million kilograms of rubber
- - 82 million kilograms of steel
- - 902 million kilograms of CO_2 emissions
- - 190 million kilowatt-hours

This is comparable to 6,015 million car kilometres, more than 150,375 times around the globe or the planting of more than six million trees.

[1] RecyBEM calculates the ecological savings with Ecotest, Ecotest gives an actual dashboard for important parameters like CO2 emission savings, costs and the saving of primary raw materials. RecyBEM has executed Ecotest together with ARN. By processing a passenger car tyre with the RecyBEM/ARN system 969 kg CO2 equivalent/ton is saved. With this system about a third of the emissions that is released with the production of tyres (2.830 kg CO2-eq per ton) is compensated. The emission of 26 kg CO2-eq are more than compensated by the benefits that are realized via the different options in the chain.

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Contents

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Opinion on the spread of rubber granulates from artificial turf fields

The RecyBEM fully supports the reaction of the European Tyre and Rubber Manufacturers' association (ETRMA). We want to give our own view in addition to the points made in the ETRMA reply. We have also included a review on available literature regarding the spread of rubber granulates and the effectiveness of mitigating measures.

RecyBEM **does not support a proposed ban** on polymeric infill materials in artificial turf fields and urges ECHA to re-assess the impacts of the proposed restriction, taking into account the broader environmental and socio-economic impacts, as well as the significant mitigating actions already being undertaken, within Member States and by the industry, to solve issues regarding the avoidable spread of infill materials.

The restriction is initiated because of a globally shared concern about increasing plastic pollution in the world. With respect to rubber infill the justification of a ban can be debated because:

1. The distribution of rubber infill occurs on a local scale and is overestimated.
2. The distribution is caused by human interventions and is not a result of natural forces such as rain or wind.
3. Human exposure to rubber infill particles is very small and no adverse effects are expected.
4. Environmental effects of the rubber particles are negligible.
5. Recycling of tyres to rubber infill has considerable environmental benefits in terms of waste streams, material and energy saving and reduced CO_2 emissions. Moreover land-use for resource extraction will be lower with obvious benefits for biosphere integrity and biodiversity. Overall, a ban would have significant impact on Europe's environmental footprint. This should not be a footnote in the current restriction proposal.
6. It will lead to a significant reduction in opportunities for citizens to participate in sport.
7. It will create issues with the capacity to recycle tyres to high quality end-products. As infill material is a significant route for ELT material. Approximately 20% of the recovered ELT material is used for artificial turf. And this amount is growing recently.
8. The current legal framework (National and European) is working well and has induced the implementation of mitigating measures and the control of the spread of rubber granulates to the environment. Inspections show no spread of the material outside of the fields.
9. Risk mitigation in the form of containment measures can be and have been easily implemented and are economically viable.

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We plea for risk mitigation measures (RMM)

We agree with the EU ambition to avoid leakage of plastic materials to the environment. Therefore, we plea for risk mitigation measures to prevent the unintentional release of rubber infill to the environment. Risk mitigation fulfills targets of the EU Circular action plan, and comprises "**certification** and regulatory measures on unintentional release of microplastics, including measures to increase the **capture** of microplastics at all relevant stages of products' lifecycle"(European Commission 2020).

The proposed restriction on intentionally added microplastics is motivated from a precautionary point of view. In our opinion a ban on rubber infill is unjustified and disproportional, because there is insufficient evidence to support a science-based ban and because efficient and viable alternative risk mitigation measures are available.
Moreover, allowance of rubber infill (instead of a ban) has benefits on a broader set of sustainability goals, and is in agreement with the execution of the EU-principles on sustainability (European Commission 2020), such as:

- increasing recycled content in products, while ensuring their performance and safety;
- enabling remanufacturing and high-quality recycling;
- reducing carbon and environmental footprints ;
- improving product durability, reusability, upgradability and reparability, addressing the presence of hazardous chemicals in products, and increasing their energy and resource efficiency.

The Dutch National Institute of Public Health and The Environment (RIVM) also recommends mitigation options, in their research report to distribution of granulate near 10 artificial sports fields (Verschoor, Bodar et al. 2018).

Risk mitigation in National and European Law

According to the "precautionary principle", activities that harm the environment or human health should be prevented and manufacturers, constructors and caretakers are held responsible for the environmental safety of their products and activities. This principle has been laid down in several national and international environmental regulations. Rubber infill started as an innovation that offered a viable solution for end-of-life tyres that could no longer be disposed of in landfill.

As an example of successful RMM, the Dutch ELT-sector (in cooperation with constructors and facility managers) acted on the precautionary principle and developed guidelines for precautionary measures, which are referred to in the Dutch environmental legislation. Already since 2009 measures to reduce spread of rubber granulates have been incorporated in consecutive duty-of-care documents, even though the environmental risks of infill were not fully established. The current, most recent, duty-of-care document (BSNC, 2019) is seen as 'best-available technique' in the Netherlands, and are considered by the Dutch governmental institute (Bodem+), responsible for the implementation of soil regulations) as an appropriate way to comply with the precautionary principle.

The presence of duty-of-care documents enables enforcement of compliance to these guidelines. The Dutch ELT-sector (by SGS-Intron) shares their experiences in a European Committee for

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Standardization[2], with the aim to implement these guidelines on a European scale. This has led to the publication of a CEN standard "CEN/TR 17519:2020 Surfaces for sports areas – Synthetic turf sports facilities Guidance on how to Minimize Infill Dispersion into the Environment" in June 2020.

Existing legal instruments can enforce correct maintenance in a proportional manner as exemplified in the Netherlands

There has been a court case in the Netherlands regarding the mismanagement of artificial turf fields resulting in the spread of rubber granulates to the surrounding area. The company responsible for the proper management of the fields was negligent. They failed to apply the proper principles and mitigating measures (as described in the duty-of-care documents) to reduce the spread of the rubber granulates, even after being told to do so on multiple occasions by the municipality. This resulted in financial penalties being imposed and an order issued to force them to implement the proper mitigating measures. This is **evidence that the current legislative framework in Member States operates as it should** and that **there is already a system in place to ensure that proper management of the fields is upheld**. All this is managed under ´**duty-of-care´.**

This same principle is also applicable at a European scale in the "Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage", the Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, and the Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration.

The legal duty-of-care documents in the Netherlands are acknowledged as legally valid recommendations for field construction and maintenance. They describe the best available technique to manage infill. Compliance can be evaluated in court cases and deviations from the recommendations in the duty-of-care documents must be properly justified.

Containment measures are effective and economically viable

Containment measures (also known as Risk Management Measures) are simple and **far less expensive than claimed by the SEAC/RAC opinion.** It is important to note that the measures, designed to keep rubber infill as much as possible on the field or on the sport premise, consist of easily fitted or retrofitted options. Typical options are: 1) boarding along the fields, 2) mats to collect material when players leave the field, 3) fences so people cannot enter the field where you do not want them to, and 4) protocols so that material is not transported outside of the field during maintenance.

The **containment measures on infill losses are well known**, simple and cheap. For instance, there are examples of football clubs using second-hand boards around the fences as barriers. Filters and brushes are not necessarily expensive either and the cost for effective containment measures is thus a fraction of what is stated in the SEAC opinion.

The measures and management protocols are therefore not rocket science. Implementation of containment measures doesn't need high-tech skills or materials and they are affordable and accessible for all clubs across Europe.

[2] CEN Technical Committee 217 Surfaces for Sports Areas, Working group 6 Artificial turf

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Current situation in the Netherlands regarding implementation of mitigating measures

The market has quickly responded to the need to implement mitigation measures. This indicates that the current legal framework regulates the market well and that municipalities have become more aware of their obligations. Measures have been implemented recently or are being implemented in the short term. Investigations and analysis of the fields with fitted measures show that these are very effective, because no rubber granulates are found in the vicinity of these fields (in soil, sewerage etc.).

Signals from the market and our own survey show that from the total number of fields in the NL (approximately 2000 fields, including all types of infill) about 35% are now equipped with mitigating measures. This includes the containment measures like (but not limited to) boarding, fences, and mats to collect infill. About 25% of the fields will need to be renovated within 3 years and will then be fitted with containment measures. The remaining approximately 800 fields will be retrofitted within the next 2 years. This is because municipalities (who are usually the owners of the fields) want to spread their investments due to available budget or have only recently started due to increased external pressure.

The current situation regarding the implementation of measures and the spread of granulates is also further addressed in the reaction of the VSG (the association of sports and municipalities in the Netherlands).

Risk assessment of rubber infill

Distribution of rubber infill to the environment

Emission of rubber infill to the environment is often overestimated, because many assessments assume that the volume equals the annual top-up of infill on the field. However, the top-up is also required to compensate for compaction of the rubber infill due to its own weight, the weight of players and maintenance equipment. With the current awareness about good housekeeping practices to prevent environmental loss, it is expected that compaction will become the main cause for topping up the infill layer. Even, with the right maintenance methods (like brushing) compaction can also be reduced to minimum.

Studies show that emission of rubber infill is a local problem, that can be mitigated by improved containment technologies around the field. Actual measurements of rubber granulate in the environment are scarce and there are no harmonized sampling and analytical methods for rubber infill in environmental samples. Many studies address the composition and leaching of substances from rubber infill, but not many have assessed the effects of the particles.

It is clear that the spread of rubber granulates is a man-made problem. Rubber particles only end up in the environment when people spread the material outside of the fields. Natural forces like wind or rain have negligible impact on the spread. When a groundkeeper/caretaker is collecting leaves and twigs from the field and then loads up his wheelbarrow, the debris will contain a certain amount of rubber granulates, depending on how careful the groundkeeper has worked. If this material is disposed of properly none of the material will end up in the environment, but if the content of the wheelbarrow is dumped in the banks or scrubs near the field for composting, this unmindful human action will cause environmental spread of rubber infill. The same goes for cleaning of maintenance

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equipment, snow clearing etc. Also care should be given when installing or renovating the field. If a big bag with rubber infill is cut open on the parking lot and then not handled with care, infill can easily spread to the environment. To prevent such practices it is important to have clear protocols and instructions for field maintenance.

Potential effect of microplastics from rubber infill to humans.

Several institutes in the world have dealt with the potential effects of rubber infill on human health. RIVM in The Netherlands has performed an extensive literature, field and laboratory study to the potential effects of rubber infill on human health for children playing soccer on the fields in 2016 (Oomen and Groot 2017). Hundred fields were sampled and analyzed on 65 chemical components, (a.o. heavy metals, PAH's, phthalate and, BPA, volatiles). RIVM accounted for exposure through inhalation of volatiles and migration of chemicals from the rubber matrix after ingestion and skin contact to rubber particles and concluded that playing on those field was safe. However, they could not account for the potential effect of the particles itself.

"The best available evidence suggests that microplastics and nanoplastics do not pose a widespread risk to humans or the environment, except in small pockets" (SAPEA 2019). Because the amount of microplastics outside the sports pitches is much lower than on the pitches, one can conclude that there is no human health issue with the unintentional emission of rubber infill to the environment.

Potential effect of microplastics from rubber infill to the environment.

For a proper risk assessment a reliable exposure concentration and a reliable assessment of the toxicity (for example an environmental quality standard) are needed. At present, scientists and regulators have not been able to propose or set environmental quality standards (EQS) for microplastics in any compartment because:

- Microplastics are too diverse to derive an EQS for the whole group. Toxicity differs between microplastic particles with different age, size, color, shape, density and chemical composition (to name a few).
- Effects of microplastics >10 um on classical risk assessment endpoints such as survival or reproduction are mostly absent or only found at very high exposure levels.
- In many studies it is not clear whether effects are caused by the particle itself or by a chemical in the plastic. When a certain chemical in plastic is responsible for the effect, it would make sense to restrict that particular chemical (as for 8 PAH's in rubber infill).
- The representativeness of toxicity tests with artificially abraded or grinded tyres or with forced leachate materials for realistic outdoor conditions is questionable, because they have different sizes, shapes and surface characteristics.
- Acute toxicity tests are not useful because microplastics are insoluble in water.
- Chronic toxicity tests makes it more likely that effects are caused by substances that leach out of the rubber matrix.
- The leached substances from rubber infill, such as zinc, are soluble and have a higher bioavailability in artificial test systems than in natural water, which leads to overestimation of effects in artificial test systems.

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The RIVM reference as used by SEAC in the consultation is not adequate to substantiate claims that ELT is "hazardous".

Considering this study (Verschoor et al. 2018) we observe that:

1. The study was not a hazard assessment, but an exposure assessment
2. That there are some (historical worst) cases where the spread of granulates has led to exceeded Environmental Quality Standards (EQS) in soil. However, EQS exceedance does not necessarily imply hazardousness. It is important to note that also non-hazardous substances can exceed EQS.
3. The risk for humans was negligible, so there was no need for soil remediation.
4. Worst case fields were examined. These do not reflect conditions of all the fields in Europe. The studied fields were more than 10 years old and were poorly managed. Since then, both awareness and management have improved.

Circularity for End-of-Life-Tyres (ELT)

The development of third generation (3G) artificial turf pitches and the use of rubber granulates go hand in hand. Without rubber granulates 3G pitches would not have been possible. The demand for rubber granulates as an infill material has come from the market. This is clearly a market pull situation and the added bonus of being 100% recycled and recyclable is an example of a successful step towards a circular economy. And as such is one of the success stories in the route towards a circular economy. Were recycled materials are used throughout society. Rubber granulates are an example of how natural or virgin materials are not necessary to create an innovative product which helps the current technology to innovate and reach the next level.

The use as rubber infill on sports field is a recycling option that does not require a chemical process and does not demand additional (virgin) materials. The rubber infill is ready for use after removal of the metal and textile parts of the tyre, followed by grinding and sieving to obtain the appropriate grain size. The use of recycled rubber infill is durable and reusable, which are important sustainability indicators. When a sports facility needs to be renovated (after approximately 10 years of service), the rubber infill can be removed from the field, washed, sieved and reused again.

Several research initiatives have shown that from an LCA perspective that ELT infill has less environmental impact than the alternatives EPDM, TPE and Cork[3]. The land-use for growing cork is immense. The land use required to supply one football pitch with cork for 10 years, needs an area of cork trees to be grown that is the equivalent in size of 130 football pitches. This land use requirements for our societies is unsustainable.

Europe, the largest importer of natural resources in the world should be expected to consider these broader environmental benefits when balancing the alleged and unsubstantiated risks for a potential transboundary problem with infill. Europe destroys 95% of the material value of resources during the first use cycle. The recycling of tyres is recognized for its success with over a 95% collection rate and a 62% material recovery rate. ELT infill for artificial turf is a key part of this success, accounting for 20% of all the recovered ELT, and in contrast, even to other ELT material recycling uses, for example, using ELT in cement, the granulate infill can be recovered and used again even after a long service as infill.

[3] Examples are the Swedish Environmental institute in 2012. And a recent 2020 study by Force Technology, commissioned by Genan[3]

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Consequences of a ban on rubber infill

An eventual ban on rubber infill will inevitably lead to more incineration of ELT, because the alternative recycling options are not sufficient to absorb all the ELT. Incineration is a destructive method that leads to more CO_2 emissions and to an unnecessary, irreversible loss of useful and valuable materials. The proposed ban would significantly increase the risk of eliminating environmental gains from the current ELT recovery regime. With regulatory and market imperfections addressed, alternative recovery paths could be opened, but this is not likely to happen in any major scale during the next several years as processes are slow.

A ban would stop the recycling of ELT for infill. This will cause a problem for Member States, as the amount of ELT tyres that would not be recycled would be significant. If export routes close and infill markets collapse, this could mean that 50%-80% of all ELT tyres in several Member States, would be left without viable recovery routes for ELT´s. Without meaningful recovery of ELT´s the Member States reliance on new natural resources will increase. Without substantial ELT recovery, local job and growth opportunities from using tyre derived materials will be lost