ETRMA contribution to the RAC/SEAC Opinion on an Annex XV dossier proposing restrictions on intentionally-added microplastics

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ANNEX

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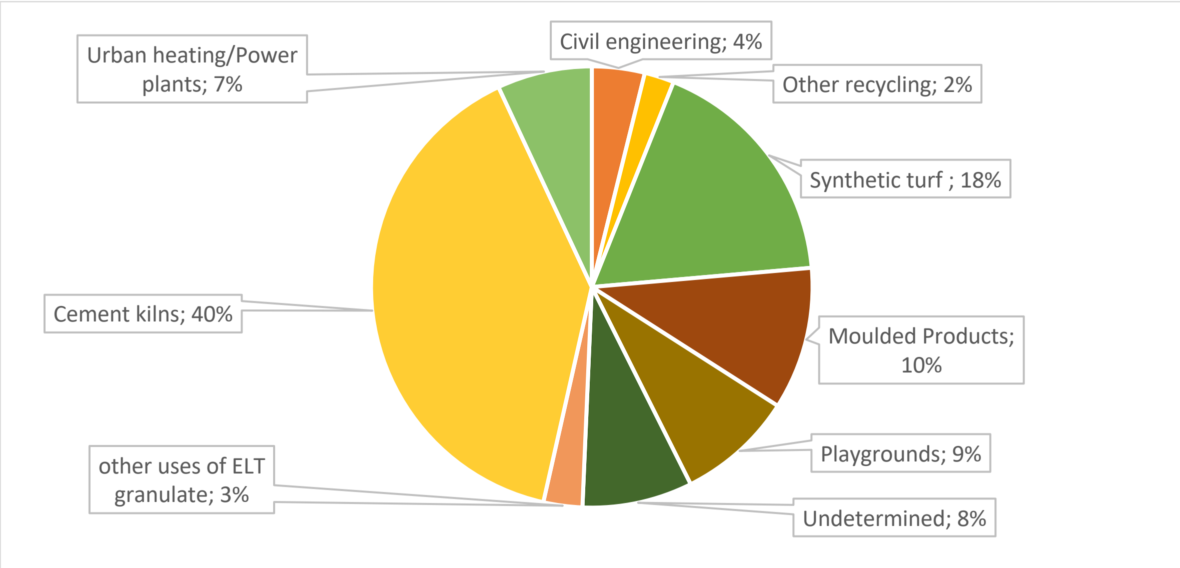
´Substances or mixtures containing microplastics for use at industrial sites'

The restriction of the use of microplastics affects the value chain of rubber recycling

There are also other uses for End-of-Life Tyre derived rubber that would be affected by the proposed ban. The graph below demonstrates the share of the different recycling routes for End-Of-Life derived rubber in the EU. From the total 2.99 million tonnes of Tyres processed, which includes the rubber, steel and textile content, it is noted that the in weight of the rubber is 1.6 Million tonnes.



Graph 1: ELT European recovery routes 2018, source: ETRMA

Rubber granules and fine rubber powders are classified as within the **size range of a microplastic and** are used in the following applications:

- Synthetic turf: ELT derived rubber is used to provide resilience and shock absorbance to artificial turf pitches.
- Playgrounds:
    - Sports surface / athletic tracks: ELT derived rubber can be used as an underlayer in sports areas such as volley ball and basketball. It is noted for its capacity to dissipate vibration and absorb impact.
    - Shock absorbing pavements for children playgrounds: ELT derived rubber is used to produce shock-absorbing floorings for outdoor applications. ELT derived rubber is also proven to be weather-resistant, permeable to water and durable.
- Moulded products, ELT derived rubber granules and powders mixed with polyurethane binders are used to produce "re-moulded" rubber products such as wheels for trolleys,

dustbins, wheelbarrows, urban furniture and even child safety corners, and many other items.

- Fine rubber powder such as Micronized Rubber Powder (MRP) is used as an ingredient for some high value applications such as tyres, plastics, coatings, roofing systems and rubber asphalt.

ETRMA welcomes the decision of the SEAC to support the dossier submitter in setting a lower size limit for Microplastics of 0.1 µm. The lower limit will help the rubber industry to adequately address their obligations under the proposed restriction when using recycled rubber.

Recycled rubber materials used in tyres or rubber products are completely embedded and integrated in the matrix, therefore we understand that:

- The production of recycling rubber articles and its use at industrial sites is exempted under provisions of paragraph 4a

As recycled rubber materials, produced within the size range of microplastic are used in industrial sites, we understand that the derogation set out in paragraph 4a applies to the use of 'micronized rubber powder and crumb rubber'.

Paragraph 1 shall not apply to the placing on the market of:
5b: 'Substances or mixtures containing microplastic where the physical properties of the microplastic are permanently modified when the substance or mixture is used such that the polymers no longer fulfil the meaning of a microplastic given in paragraph 2(a)'.

- The use of recycled rubber material, such as micronized rubber powder, in rubber products, for example, tyres or conveyor belts, are exempt under the provisions of paragraph 5b

Paragraph 1 shall not apply to the placing on the market of:
5c: 'Substances or mixtures containing microplastics where the microplastic is permanently incorporated into a solid matrix when used.'

- Rubber granules for playgrounds and moulded products have visible granules. These granules are strongly bonded and compacted into the matrix of the rubber. It is our understanding, therefore, that this rubber granule usage is allowed as per the exception described under paragraph 5c.

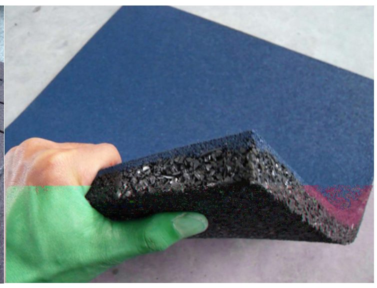
 

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Figure 1: Examples of granules used in playgrounds and moulded products

With reference to the proposed measure of the reporting obligations in paragraphs 7 and 8: ETRMA invites regulators to keep reporting as voluntary until a defined method to address microplastics released to the environment is available in such a way that it would not affect downstream users of articles derogated under provision 5b (by setting of a lower size limit for Microplastics of 0.1µm as supported by SEAC).

For large corporations in the rubber sector, mandatory reporting could be seen as an opportunity to demonstrate efforts to use recycled materials in articles. However, for small to medium sized companies, this is an extra burden that would discourage the use of granulated rubber or the opening of new uses or markets.

Mandatory reporting obligations would also apply to users of recycled polymers materials that are distributed in the form of microplastics. In the production of rubber, and particularly for the production of general rubber goods, there is a large variety of materials which are batched (pre-dispersed) in elastomer or polymer, many of them showing particles below 5 mm. This is done either for safety at work reasons, (to avoid exposure by inhalation of dusty materials) or to facilitate the mixing process, e.g. using pigment polymer batches, fibre batches or peroxide-batches (with small particle sizes). These batched polymers are transported from suppliers and dealers to their industrial customers and their industrial production sites. There is no intentional release. Dust is normally held back at exhaust-air system filters and residues are either disposed of or recovered.

The proposed new version of paragraph 8, by the dossier submitter requests even more reporting obligations for downstream users of microplastics, even if those microplastic are no-longer classifiable as microplastics when included in the final product (derogation 5b)

The mandatory reporting obligations will affect the use of recycled rubber goods. For instance, producers of ELT derived rubber moulded products, such as tiles or carpets, will be required to report in a language that is not their own, to ECHA. The reporting obligations for small enterprises (with less that 5 employees), that install shock adsorbing pavements (playgrounds, sport surfaces). Reporting in English is burdensome and would be quite unusual for them. This reporting obligation would not apply to producers of tiles and carpets that do not use recycled rubber material, creating an unfair disadvantage and hampering the turn towards a circular economy.

Downstream users of Micronized rubber powder (MRP) would be heavily affected.
MRP is used for tyres and other technical rubber goods but as the use of the MRP would become burdensome, this would discourage the research and development of those end uses.

The proposed reporting obligations need to be balanced with the benefits that they will bring about.

Reporting obligations need to be focused and workable. A clear framework and new methodologies are needed in order to provide comparable data and results.

Furthermore, in paragraph 8, states that reporting obligations shall not apply to articles derogated under provision of 5b, as the microplastic in the product will no longer be considered a microplastic.

ETRMA considers that such reporting obligations would affect downstream users of recycled rubber products (as derogated under provision 5b). ETRMA invites regulators to consider maintaining reporting as voluntary until a defined method to address microplastics released to the environment is available.

Paragraph 4h: 'Granular infill used on synthetic sports surfaces'

Infill losses

Existing scientific **measurement-based investigations** [1,2,3] on 'direct sampling from pitches and a mass flow analysis of infill', **do not support** the assumptions that:

Assumption:
*Losses of ELT infill are substantial and '**migrate**' with wind, rain or ocean currents making it transboundary irreversible 'pollutant'*
Fact: The potential losses that sediment locally, can be addressed, (if necessary, by the party responsible for 5littering). They are not dispersed widely across the aquatic environment.

Assumption:
The top-up of infill is correlated to estimated losses to the natural environment.
Fact: Top-up is related to the extent to which the granules are de-compacted, (brushed back to their original porosity) after use. Losses are related to how the

[1] H Løkkegard, et al, 2019 Teknologisk Institut
[2] Møllhausen, et all 2017. Forskningskampanjen
[3] Regnell 2019; Dispersal of microplastic from a modern artificial turf pitch with preventive measures - Case study Bergaviks IP, Kalmar.

pitches are constructed and managed. Losses to the aquatic environment are not correlated to the amount being topped-up.

The UK based consultancy Enuomia stated in their report that the data quality [for infill losses] was 'unacceptable' for their 'key assumption' **to estimate the infill losses and that** [infill losses] were a key assumption for impact assessment[4]. Unfortunately this was not elaborated upon further, but instead used as direct input for their extrapolation of the assumptions on a Europe-wide scale 'Infill replacement rates suggested at 3% per year. Range of 1—4% used'. The suggested improvement **'Direct sampling from pitches and a mass flow analysis of infill'[5]** is however relevant to prove or disprove the hypothesis. Although the percentage of infill top-ups expected to reach the aquatic environment has been reduced by the dossier submitter, RAC does not remedy the primary error and continues to use top-up amounts as evidence for infill losses to the drainage systems (nor the environment).

The Eunomia consultants did not have access to actual data, based on direct sampling from pitches and a mass flow analysis of infill information, which is now available. Instead the baseline was formed from the same assumptions made by the Scandinavian consultants from Denmark[6], Sweden[7] and then Norway[8]. They all lacked theory as well as field data when backing up their quantifications of infill losses from football pitches into the aquatic

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[4] Hann, et al. Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products. Eunomia, page 302

[5] Hann, et al. Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products. Eunomia, page 302

[6] Lassen, C., S. Foss-Hansen, K. Magnusson, N. Norén, N. I. Hartmann, P. Rehne-Jensen, N. T.G. and A. Brinch (2015). Microplastics. Occurrence, effects and sources of releases to the environment in Denmark, Danish EPA: 208. The report notes that a: "**No studies** on the release of microplastics from artificial turfs have been identified." Then make following assumptions:
"Parts of the infill granules will disappear from the field to the surrounding area and must therefore be continuously replaced, while replacement sometimes is necessary due to compression of the infill granules on the field. It is **estimated** that the consumption of infill granules is 3-5 tonnes per year for a standard football field (DHI 2013). It is **assumed** that the release is equal to **half** of the consumption of infill granulate i.e. 1.5-2.5 t/year."

[7] Magnusson, K., K. Eliasson, A. Fråne, K. Haikonen, J. Hultén, M. Olshammar, J. Stadmark and A. Voisin (2016). Swedish sources and pathways for microplastics to the marine environment . A review of existing data. (revised version 2017), IVL on assignment from the Swedish Environmental Protection Agency. The Swedish consultants make the following claim: "The company Unisport (www.unisport.se) recommends that about 3-5 tons of rubber fill is used for refill every year to preserve the properties of the artificial turf… …That **could be a rough** measure for the yearly loss of rubber fill from artificial football fields… …**means that** a total of around **2 300-3 900 tons** of rubber granules per year **will be lost** from the surfaces…. And can end up in the sea".

[8] Sundt, P., F. Syversen, O. Skogesal and P.-E. Schulze (2016). Primary microplastic pollution: Measures and reduction potentials in Norway., Mepex, who used the Swedish report (Magnusson et al 2016) as **evidence** for polymeric infill pollution in Norway: In the former Mepex report…**we had the understanding that any loss from the fields was collected…** In Norway, based on data from Sweden, we roughly estimate an annual loss to the environment of **3.000 tonnes** of granules from football fields annually."

environment. They also used each other's assumptions as scientific evidence, (as shown in the footnote). Before taking quantifications as facts or trying to improve them, the fundamental assumptions needs to be reviewed. The inadequate assumptions are explained briefly hereunder:

1. None of the consultants discriminate between the places where the losses occur nor where they are is lost to. Infill top-up is used as evidence for losses that end up in the aquatic environment, the only real difference between the Scandinavian researches mentioned in the paragraph above, Eunomia's team, the dossier submitter and RAC is the percentage of top-up is used as evidence for what is dispersed into the aquatic environments. **Top up of infill is, however, not correlated to the amounts of infill that is lost to the natural environments**.
2. **Most of the ´alleged´ losses stay on the field as compacted infill**, which in some cases, is compensated for by topping up. In other cases it de-compacted (brushed back to its original porosity). Compaction has been thoroughly investigated and is measured to range between 9 and 28 tonnes of ELT -infill per pitch after 200 uses. This range depends upon whether or not the maintenance staff de-compact the infill on the pitch after use[9]. **This compacted infill stays on the pitch.** It only appeared to be lost and therefore the infill top-up was incorrectly documented by the Scandinavian consultants as evidence of widespread migration of infill into the aquatic environment.
3. This apparent infill loss was then used as a baseline of how to estimate losses to the aquatic environment, and was subsequently used by Eunomia (2018) and then elaborated upon by the dossier submitter and subsequently by RAC.
4. To properly quantify the risk of losses to the aquatic environment, measurement-based field data is essential, as well as a framework within which to apply such data. With accurate data, a mass flow analysis of infill can be established.
5. The Eunomia team used the top-up volumes as a measure of losses to the Waste Water Treatment facilities. The Eunomia team however notes "Data is not available for this and consequently it is difficult to estimate the true impact of compaction on potential loss calculations.' Their analysts noted the need for 'mass-flow analysis' to be able to determine any true figures. However, there is no mass-flow analysis in the RAC opinion and SEAC consultation.

   The below graph summarises various types of estimations on losses to the aquatic environment. It illustrates the necessity for measurement-based field data and a framework within which to understand how the 'losses' correlate with losses to the natural environment.

[9] Fleming PR, Forrester SE, McLaren NJ. Understanding the effects of decompaction maintenance on the infill state and play performance of third-generation artificial grass pitches. Proc Inst Mech Eng P J Sport Eng Technol. 2015;229(3):169–182. doi:10.1177/1754337114566480

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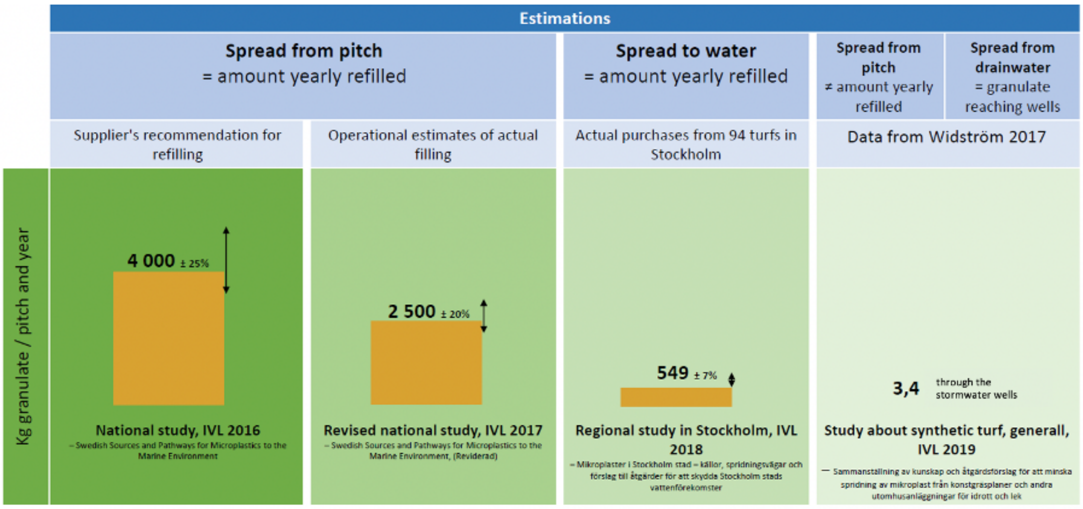

Graph 2: Measured data provides a very different result of the losses to the aquatic environment. In addition to providing a factual baseline, these measurements enable the development of frameworks in which to understand where the 'lost infill' is going.[10][11][12]

Distinguishing where the losses occur is important in order to assess the damage and the potential migration. The illustration below shows four systems that are essential to the understanding of infill losses.

- System 1: represents the artificial turf pitch.
- System 2: represents sports facilities and the immediate areas around the artificial turf pitch, inside any existing boundary.
- System 3: represents all surfaces outside of system 2, except aquatic environments.
- System 4: represents aquatic environments/recipient, for example lakes and seas.

[10] Magnusson, Olshammar, et al (2016, 2017). Swedish sources and pathways for microplastics to the marine environment . A review of existing data. IVL on assignment from the Swedish Environmental Protection Agency
[11] Oldshammar et al (2018) Mikroplaster I stockholm stad (micro plastics in the city of Stockholm), IVL
[12] Widström, K. (2017). Migration av gummigranulat från konstgräsplaner (Migration of rubber granules from artificial greens) Sweden, Stockholm University:

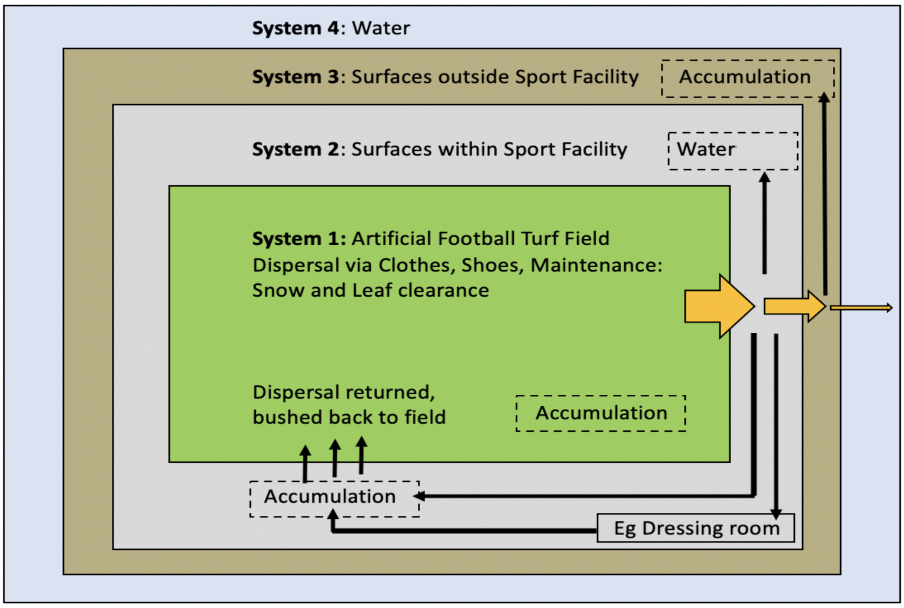

Figure 1: Causes of dispersal and inner and outer systems around the pitch. Only very limited amounts end up in system 4. Source: Regnell (2017), Ecoloop

6. Most of the infill "losses" occur and stay within System 1 due to compaction. These are not to be confused with losses of infill to the biosphere nor to the aquatic environment. This infill only appears to be ´lost´. **In fact, it stays on the turf pitch, just compacted.**
7. Infill dispersal in System 2 has been incorrectly evidenced with photographs of piles of snow containing infill. This infill dispersal is not an environmental issue unless it is deliberately moved outside of its holding place and out into Systems 3 or 4.
8. In System 3, infill losses accumulate and stay where they are left, either by players, or maintenance staff.
9. System 4 is the aquatic environment. The environmental concern is not clear, as ELT infill should not end up here. If managed properly, infill will stay within system 1, where it can await further usage.

The data inadequacies and incorrect assumptions were not corrected by the dossier submitter nor by RAC, who although reduced the estimated losses, they did so without changing the basic assumption that the top-up of infill is correlated to losses to the natural environment or more specifically, to the aquatic environment

Properly managed fields do not pose a major concern.

- The measurement-based reports that exist,[13] [14] [15] show that very little infill will end-up in the natural environment, unless purposely mismanaged or placed there. An artificial

[13] H Løkkegard, et al, 2019 Teknologisk Institut
[14] Møllhausen, et all 2017. Forskningskampanjen
[15] Regnell 2019; Dispersal of microplastic from a modern artificial turf pitch with preventive measures - Case study Bergaviks IP, Kalmar

turf football pitch without Containment Measures, can disperse up to 50kg of infill per year[16], of which only a fraction would reach the drainage system.

Dispersal route	*Potential annual spread (kg)*	*Spread that can be prevented (%)*	*Spread to recipient*
A. Stormwater drains (mp > 200 µm)	~ 15.5 kg	~ 100 %	-
B. Surface water from asphalt (10 µm < mp < 200 µm)	~ 0.01 kg	~ 100 %	-
C. Drainage water from the pitch (10 µm < mp)	~ 0.07 kg	~ 100 %	-
D. Collection well (10 µm < mp < 100 µm)	~ 0.1 kg *(of which approx. 10 % granules)*	0 %	0.1 kg
TOTAL*		> 99 %	**0.1 kg**

** The detection limit for microplastics in water is 10 µm with the analytical methods used. Microplastics below this size are not quantified.*

Dispersal route	*Potential annual spread (kg)*	*Spread that can be prevented (%)*	*Spread to environment*
E. Players (shoes & socks)	~ 26.8 kg	~ 100 %	Ground, greywater
F. Maintenance vehicles (excl. brush)	-----	-----	----
The pitch is 100% brushed when 100% dry	~ 12.4 kg [a] ~ 0,1 kg [b]	~ 100 %	Ground, stormwater
The pitch is brushed 50/50 % dry/wet	~ 24.1 kg [c] ~ 6.2 kg [d]	~ 100 %	Ground, stormwater
TOTAL		~ 100 %	-----

a) The amount is from both brushing the vehicle and then blowing with compressed air. Based on 1 measurement under dry conditions.
b) The amount is from blowing off the vehicle with compressed air after routine brushing has taken place. Based on 3 measurements under dry conditions.
c) The amount is from both brushing the vehicle and then blowing it off with compressed air. Based on 2 measurements; 1 in dry conditions and 1 in wet.
d) The amount is from blowing off the vehicle with compressed air after routine brushing has taken place. Based on 5 measurements; 3 in dry conditions and 2 in wet

Table 1: Microplastic losses from a football field turf pitch that is managed according to the Swedish Football Associations recommendations, i.e. normal routines. Before and after Containment Measures.[17] results are congruent with two other measurement-based reports: [18] [19]

[16] Regnell 2019; Dispersal of microplastic from a modern artificial turf pitch with preventive measures - Case study Bergaviks IP, Kalmar

[17] Regnell 2019; Dispersal of microplastic from a modern artificial turf pitch with preventive measures - Case study Bergaviks IP, Kalmar

[18] H Løkkegard, et al, 2019 Teknologisk Institut

[19] Møllhausen, et all 2017. Forskningskampanjen

Mismanagement of artificial turf football pitches are a key factor within the proposal for a ban, but there has not been a systematic assessment of the occurrence

There is to date no measurement based scientific study on how widespread the occurrence of mismanagement is.

- The Ecoloop 2019[20] study found that it was the lack of maintenance routines that were responsible for the potential infill losses, especially during wet weather conditions. Top-up amounts are not relevant to estimate infill losses.
- The turfs and installations are not responsible for the release of microplastics into the aquatic environment, unless mismanaged. Even with the absence of Containment Measures, the total losses to System 3 or 4 is likely to be within the proposed derogation limit proposed by SEAC and RAC of 50 kg per pitch, per year.
- The number of studies with measured data are small. We have obtained six studies that have described, monitoring results under outdoor conditions. The aims and the studies differed from each other, which is reflected in the set-up, accuracy and usefulness of the results. Aims varied from mass balance[21], environmental impact[22], infill loss by shoes[23], sampling of field data of dispersal to drainage systems[24] to efficiency of mitigation measures[25]

- The studies that attempted to quantify the dispersal of ELT-granules and the annual infill top-up demand were all conducted on fields that were constructed and maintained in a period when mitigation measures were not practiced, except for the study by Regnell (2019). The estimated quantities in these reports must be recognised as a representing a worst-case scenario. Worst case scenarios occur by an unawareness of how granules disperse and the need for containment measures to mitigate microplastic dispersal.

- The 10 extreme cases of poorly managed artificial turf pitches that were investigated in the Netherlands[26] were not found to require action to remedy the displacement of infill.
- Should legal action be required it is within the power of both councils and national authorities to utilise the legislation and guidance that is in in place in several Member States.

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[20] Regnell 2019; Dispersal of microplastic from a modern artificial turf pitch with preventive measures - Case study Bergaviks IP, Kalmar

[21] Weijer, Knol et al. 2017, Verspreiding van infill en indicatieve massabalans. SWECO Nederlands

22 Verschoor, Bodar, et al. 2018. Verkenning milieueffecten rubbergranulaat bij kunstgrasvelden, RIVM

[23] M Møllhausen, et all Sjekk kunstgressbanen [Check the artificial turf pitch] - Rapport fra undersøkelser om svinn av gummigranulat fra kunstgressbaner, gjennomført av over 12 000 elever og spillere høsten 2017. Forskningskampanjen

[24] Widström, K. (2017). Migration av gummigranulat från konstgräsplaner (Migration of rubber granules from artificial greens) Sweden, Stockholm University:

[25] Regnell 2019; Dispersal of microplastic from a modern artificial turf pitch with preventive measures - Case study Bergaviks IP, Kalmar

[26] Verschoor, Bodar, et al. 2018. Verkenning milieueffecten rubbergranulaat bij kunstgrasvelden, RIVM

Infill losses and mismanagement can be dealt with locally.

- A study from the Netherlands [27] showed that lost granulate was disbursed to grass and paved areas, **up to 2m away from the field and could accumulate to a depth of 15 cm. Whilst this infill is accumulates, it is not dispersed further**. During the renovation of a field and whilst containment measures are being installed, any dispersed infill can easily be removed and reused,.
- Two studies[28 29] sampled and analysed (independently from each other) the topsoil around artificial turf football pitches in the Netherlands that had no containment measures in place nor restrictions on the use of, for instance, leaf-blowers. They show similar amounts: 240-280 kilos per field per year (see Illustration 6). In these extreme cases, the amounts lost to soil accounted for approximately 12% of the annual top up. Please note that these reports were dated in 2018 and may not have been available to the dossier submitter at the time. They were made on pitches managed with little or no consideration for the dispersal of microplastic to the surrounding areas.
- **These ´worst cases´ are still exhibiting much less infill losses than approximated by RAC for all fields without containment measures, regardless of their maintenance routines**. This calls into question the RAC average figure for both well managed pitches and worst-case scenarios.
- **The fields studied** were poorly managed for over 10 years and contained old piles of infill that were collected and reported upon by the scientists. Since then, both awareness and management have improved considerably.
- It is also important to be aware of the fact that ELT infill (75-80% of all polymeric infill in Europe) during use are carried a very short distance, unless by human error from maintenance staff, the losses are primarily coming from players football boots (90%) and players clothes (10%).
- **In the aquatic environment ELT infill sediments close to source.** ELT granules are heavier than water and also have a neutral surface charge[30] which reinforces the propensity for them to sediment close to source. This is not only due to the fact that ELT infill is heavier than water. There are factors which control micro and nano-plastic aquatic mobility. Of importance are properties such as particle size, shape, density, surface smoothness (crystalline-like plastics like polypropylene or rubber-like polyethylene), surface charge, specific surface area and age. Micro and nano-plastic colloids that end up in the aquatic environment may stay in suspension[31] as long as the plastic particles are charged (either positive or negative charge). If the surface charge of a particle is zero, it will be able to settle by aggregation to a greater extent. The surface charge of a particle is pH dependent and can change from positive to negative at altered pH levels. An important

[27] Verschoor, Bodar, et al. 2018. Verkenning milieueffecten rubbergranulaat bij kunstgrasvelden, RIVM
[28] Weijer, Knol et al. 2017, Verspreiding van infill en indicatieve massabalans. SWECO Nederland B
[29] Verschoor, Bodar, et al. 2018. Verkenning milieueffecten rubbergranulaat bij kunstgrasvelden, RIVM
[30] Magnusson, Mascik, Specific Surface and Surface Charge of tire material and tire particles. Ecoloop 2019
[31] López-Morales1, J., Perales-Pérez, O., Román-Velázquez, F., 2012. Sorption of Triclosan onto Tyre Crumb Rubber. Adsorption Science & Technology Vol. 30 No. 10 2012

measure of surface charge is the Zero Potential Charge or pH_{ZPC}. The pH_{ZPC} for tyre material is about 7. ELT infill does not act this way and is a stable material. This means that the surface charge is such that the ELT infill will not be carried away with water, due to charge differences, and sediments[32].

- **This sedimentation effect of ELT infill has not been taken in to consideration.** This effect means that **ELT infill will not float around in the aquatic environment, appearing to be food** and disrupt life for the 663 aquatic life forms and the food chains as analysed by CBD[33] and referred to by Essel. (2015)[34] and as used by Eunomia[35].
- Infill losses are a local issue that may occur if the artificial turf football pitch is mismanaged. **ELT infill is not a transboundary, irreversible pollution problem for the European Union**.

Mandatory Containment Measures would eliminate any concerns of accumulation

- **Containment Measures**, as ESTC[36] and others have noted, are not prohibitive and are a less costly solution to placing ELT-based infill with an alternative infill when a field needs to be replaced.
- Containment Measures are **stipulated by some authorities and federations across Europe**. Below is a summary from the Norwegian Environmental Agency's points for containment measures:
  1. A barrier (which could be made from recycled wooden or metallic advertising boards) can be fitted around the pitch. They would need to have a height of at least 20 cm to ensure that infill material cannot spread from the pitch.
  2. A place should be provided next to the pitch where shovelled-out snow is contained so as to prevent the spread of infill outside the facility
  3. Containment measures, such as brushes, should be in place to prevent the spread of infill via players football boots or clothes.

[34] López-Morales1, J., Perales-Pérez, O., Román-Velázquez, F., 2012. Sorption of Triclosan onto Tyre Crumb Rubber. Adsorption Science & Technology Vol. 30 No. 10 2012

[33] Secretariat of the Convention on Biological Diversity (CBD), Marine debris: understanding, preventing and mitigating the significant adverse impacts on marine and coastal biodiversity 2016

[34] Essel and all, 2015. Sources of microplastics relevant to marine protection in Germany Federal Environment Agency GFEA (Germany), page 9

[35] Hann, et al. Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products. Eunomia, 2018. Page 10, 35 and 390

[36] ESTC is the EMEA Synthetic Turf Council, a non-profit trade association representing European, Middle East and African based companies manufacturing synthetic turf surfaces and the components used to form the surfaces and also companies that install and maintain synthetic turf surfaces. Members also include sports federations that use synthetic turf surfaces. At present ESTC has over 80 members and further details may be found at https://www.estc.info. ESTC works closely with the Synthetic Turf Council (STC) a trade body that undertake a similar role to ESTC in the North American market.

Containment Measures can reduced losses to virtually zero

- A properly managed artificial turf football pitch with Containment Measures in place, can mitigate ELT infill losses to 10 grams per pitch per year. **At least 99% of the potential spread of microplastics can be prevented.**

ELT infill is safe to use

It is regretful that SEAC´s opinion on page 60 states that 'ELT is known to be hazardous' to the environment, with (RIVM 2018[37]) as a source. Without taking into account the state of knowledge as explained below.

Firstly, the RIVM reference as used by SEAC in the consultation is not adequate to substantiate claims that ELT is 'hazardous'. In the referred report it showed:

a) no **acute impact on the environment was found**, so there was no need to sanitise.
b) that **improper management can result in the spread** of rubber granulate
c) that there **might be some cases** where the spread of granules could lead to exceeded Environmental Quality Standards, (EQS) however, again this would be a result of mismanagement. It is important to note that non-hazardous substances can exceed EQS. **EQS exceedance does not imply hazardousness**.
d) the study was not a hazard assessment, but **an exposure assessment**
e) Only worst case pitches were examined. These do not reflect conditions of all the pitches in Europe.

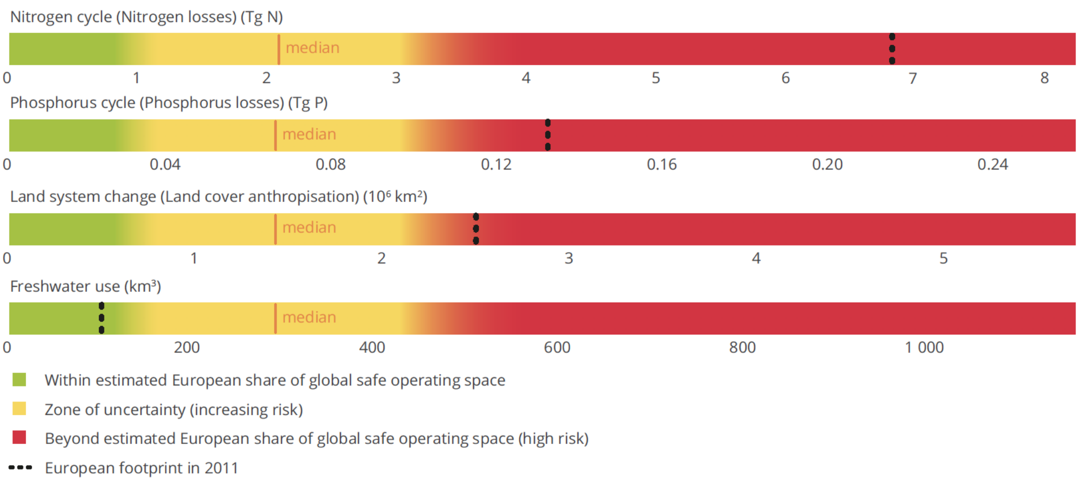
Secondly, chemical components are strongly bounded to the rubber matrix, as the vulcanization process acts like a 'safe', binding the elements physically and mechanically within its molecules

- Tyre rubber is **purposefully designed to be durable and dependable**.
- It would take **1000 years to effect 1.25mm of ELT-rubber** in a corrosive environment. Malek and Stevensson (1986)[38] studied how tyre material, that has been in an oxidizing environment for 40 years had been affected. Chemically, the material was unaffected except for the outermost layer, 50µm thick, which appeared to have been affected. If the rate of degradation, here defined as ´chemical impact´, continues at the same rate as was seen during those first 40 years, it corresponds to 1.25µm per year. This means that after 1000 years, only 1.25mm of the surface layer of the rubber would be chemically affected. This is an **indication of how slow the release of trace elements is** from tyre rubber.

The move towards a circular economy takes maximum advantage of resources already available

[37] Weijer, Knol et al. 2017, Verspreiding van infill en indicatieve massabalans. SWECO Nederlands
37 Verschoor, Bodar, et al. 2018. Verkenning milieueffecten rubbergranulaat bij kunstgrasvelden, RIVM
[38] AB-Malek, K. och Stevenson, A. (1986). The effects of 42 years immersion in sea water on natural rubber. Journal of Materials Science, Vol. 21, s. 147-154.

- The Recycling of ELT derived rubber is a **good example of a functioning circular economy in practice**. By extending the life of a natural yet technologically advanced resource such as rubber, minimises the depletion of natural resources from our planet. Today we live in Europe in a way that exceeds the planets regenerative levels by a factor of 4. After the tyre granules have brought benefits to an artificial turf pitch, they have already saved on other resources, including:
- The releasing of Greenhouse gases, that would be required for the extraction and use of the currently available alternatives, would be saved.
- Infill can be easily re-collected and reused in other products.
- The European performance, under two of the Planetary Boundaries, Land System Change and Phosphorous cycle, are beyond the ´European share´ of the calculated limits[39] for a 'Global Safe Operating Space'. In addition to this, Biosphere integrity and Climate Change are also in the red (high risk). The Phosphorus cycle is highly relevant, as replacing recycled ELT infill with biologically grown alternatives, disturbs the natural flow of phosphorus in the area that it produced. Using recycled materials rather than new, raw biological alternatives or natural grass alleviates phosphorous overuse. Phosphorous is essential for all forms life to function and it is a finite resource.



Note: The yellow range of the figure represents the average range across the five allocation principles, with a median of 7.3 %. This yellow range is defined as the 'zone of uncertainty' to reflect the normative process of defining a European 'safe operating space'.

Graph 3: EU policy needs to be brought into line with the thresholds of the Planetary Boundaries[40] A transition to a Circular Economy is paramount to be able to achieve this.

[39] Bringing EU policy into line with the Planetary Boundaries, SEI 2017, page 10
[40] Bringing EU policy into line with the Planetary Boundaries, SEI 2017

Better alternatives than ELT infill are not likely to materialise

As concluded by ESTC[41] and EURIC[42] the volume of infill materials needed, for use across Europe, will not be available with the alternatives currently on offer.

Alternatives that work as well as, and are at the same price-point as ELT, are difficult to obtain. **The functionally advanced characteristics of ELT infill has been financed by the use for its first application, as a vehicle tyre.**

Over the past years 10-20 years more and more artificial turf pitches have been installed across Europe. From the smallest community to the largest cities, artificial pitches allow citizens of all socio-economic backgrounds to have access to high quality sport fields. Outdoor artificial turf pitches have from the beginning relied on the availability of ELT derived granules, as an efficient and reliable source of infill. The material is affordable, meets the technical requirements and is widely available. The development of outdoor artificial turf pitches is intrinsically linked to the development of the ELT derived, rubber granules market. Alternatives to ELT infill that perform equally technically, that are available in sufficient quantities, are affordable and create less of an environmental impact are not currently available. A ban of any polymeric material, including ELT derived rubber, would trigger a chain reaction of consequences that would affect the availability of safe, high quality performance artificial turf football pitches across Europe.

The demands on infill are considerable. In order for artificial turf pitches to provide a well-functioning playing surface for football whilst being safe for the players, it has to fit within a large number of parameters. Environmental performance is also effected by, amongst other things, the choice of materials, design, operation and care, and waste management.

Below are some of these demands that ELT-infill meet:

- The performance of the artificial turf, in terms of game characteristics and injury risk, is mitigated by design and ELT infill.
- The torsional resistance between shoes and artificial turf pitches. Torsional Resistance is the friction that can occur between the artificial turf and players' skin, the ball when it bounces, its roll resistance, trajectory etc.,(FIFA 2015). If the torsional resistance is too high or the pitch too slippery, injury can be more easily caused to the players.

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[41] ESTC is the EMEA Synthetic Turf Council, a non-profit trade association representing European, Middle East and African based companies manufacturing synthetic turf surfaces and the components used to form the surfaces and also companies that install and maintain synthetic turf surfaces. Members also include sports federations that use synthetic turf surfaces. At present ESTC has over 80 members and further details may be found at https://www.estc.info. ESTC works closely with the Synthetic Turf Council (STC) a trade body that undertake a similar role to ESTC in the North American market.

[42] The European Recycling Industries' Confederation – EuRIC AISBL – is an umbrella organization for the recycling industries in Europe. Within the confederation, EuRIC Mechanical Tyre Recycling (MTR) Branch aims to promote the recycling of end-of-life tyres (ELT) across Europe. This branch consists of companies and organizations who recycle ELT using mechanical processes and market recycled rubber, steel and textiles obtained from ELT.

- Using the Scandinavian climate as an example, the retention of water on a pitch becomes extremely important as a frozen pitch increases the risk of harming the players.
- The colour and properties of the material also affects how much heat it can retain for example, in sunny weather.
- The shape and size of the granules, determines the level of compaction underfoot. ELT granules mitigate this as the they are produced in equal sizes and compact less (or more slowly) thus affecting the materials life usage.
- Whilst players and operating machines can spread ELT infill, alternative, lower-density infills can be carried away with wind or rain and can also float away in water.
- Fine dust from less durable infills can also stick to clothes and skin.
- Infills that retain static charge can get stuck on shoes, clothes and footballs and risk spreading more easily and pose a risk of injury when the ball is ´headed´, as they could end up in a player's eyes[43].
- The ageing and abrasion properties of an infill material affects the risk of injury, game characteristics, environmental performance and its longevity.
- A very important aspect for the life of artificial turf pitches, is that the grass strands should not fold and flatten down, as it is not possible to straighten the fibres again. Once folded down, the artificial turf then ceases to work properly (Loughborough University 2020).

Today's plans (3rd generation plans of the latest version) have been developed over a long period of time to maximise optimal function, safety and are based on infill providing:

- Stability for the artificial turf on the football pitch and the grass strands
- low failure rates of the turf system
- reduced injuries

Infill also needs to be

- UV-resistant
- temperature insensitive
- ageing-resistant
- vermin resilient
- heavy enough not to blow away or float away with rainwater,
- insensitive to static electricity
- not become sticky when damp
- chemically stable,

[43] https://mitti.se/nyheter/miljovanligt-konstgras-ingen-hit/?omrade=farstaskondal

ELT infill stands out in that in its production and maintenance, it does not need to be chemically sprayed with insecticides or preservatives. The required protection for its use is built into the molecular structure.

These features meet the highest requirements for both elite football whilst protecting players of all ages and abilities, from injury.

ELT infill delivers substantial environmental benefits. **Life Cycle Analysis comparisons cannot yet be made for the currently available ELT infill alternatives such as** sugar-cane, wood-based infill, as they are still trial products. Their environmental as well as functional performance is yet to be seen.

In the Scandinavian market the use of alterative infill has not been a success. The new alternative infills do not work effectively. This results in uncertain key elements being unfulfilled, such the number of playing hours they will be able to provide.
Non-polymeric alternatives are all subject to cultivation, irrigation, process, transport and weed control. There is also considerable uncertainty about whether these materials will meet the functional and accessibility requirements.

Life Cycle Analysis studies[44],[45] conclude that ELT infill has less environmental impact than the alternatives that have LCAs or are available EPDM[46], TPE and Cork.

The biological alternative, Cork has slightly higher impact on Greenhouse gases due to transport from the cultivation sites and much higher land use. In the SEAC annex, cork is claimed to have a lower Global warming potential, with a reference to a Life Cycle Analysis performed at Ecotest, 2015. **This Life Cycle Analysis however, uses the unit 'per tonne of infill', which is not a comparable unit as the lifespan of cork is much shorter than that of ELT**. It is therefore misleading as a comparison by, at least, a factor of two.
The land-use for growing cork is immense. To supply one football pitch with cork for 10 years, necessitates an area of cork trees to be grown that is the equivalent in size of 130 football pitches**.**

New raw materials tend to require considerable land use and that requirement is unsustainable. Less than 5% of the world's total land surface is unaffected by mankind and 81% has multiple stress factors from human activities. **By way of example,** even in sparsely populated Sweden, the natural environment is marked by our need for resources. Sweden's forested areas are now covered by trees that are less than 40 years old. Of the 27 million hectares of forest, 85% are planted productive forests, and only 3% are listed as protected in nature reserves or national parks[47]. This situation

[44] Livscyckelanalys på återvinning av däck, IVL 2012
[45] Johansson, 2018. LCA granulat för konstgräsplaner, Ragn-Sells AB
[46] EPDM – Ethylene Propylene Diene Monomer Rubber (synthetic rubber)
[47] Bringezu S, Bleischwitz R (2009) Sustainable Resource Management—Global Trends, Visions and Policies (Greenleaf Publishing, Sheffield, U.K).

can be expected to be considerably worse in countries with less developed legal systems.

Loss of habitats, i.e. land use - is the single biggest threat to terrestrial and freshwater species[48]. There is a **direct relationship between the large scale extraction of raw materials and the cultivation of new natural materials and ongoing species extinction**. **Europe, the largest importer of natural resources** in the world, should be expected to consider this when making decisions and to analyse in detail, whether the alleged transboundary problem with ELT infill is substantiated or not.

The European recycling of tyres is recognised for its success with over a 95% collection rate and a 62% material recovery rate. ELT infill outperforms other rubber recycling uses as the granule infill can be recovered and used again even after a long service as infill on an artificial turf pitch.

The proposed ban would significantly increase the risk of eliminating environmental gains from the current ELT recovery regime. Even with regulatory and market imperfections addressed, alternative recovery paths could be opened, but this is not likely to happen quickly not on any major scale for many years as processes are slow.

Decoupling resources is a key element in any transition to sustainability, as well as reducing supply, economic and geopolitical risks for Europe that links consumption and production to the Sustainable Development Goals (SDG). One simple way to show that is by looking at how the SDGs are correlated to each other. The one goal with which most other SDGs are depended on, is Goal 14, Sustainable Consumption and production: 14 out of 17 SDGs are interlinked to this one goal[49].

A ban would create substantial difficulties in Member States in what to do with high volumes of un-recycled ELT material

- ELT derived rubber is generated in large volumes and in many Member States it is considered as waste. Materials included in the waste legislation framework have more administrative barriers to find new uses and applications, and this hampers the investment and research on new uses of ELT derived rubber.
- There is a **lack of alternative recovery routes** to ELT infill if a ban would come into force.
- This is **not a problem that would be quickly fixed**. Many Member States are not ready yet to adapt their regulations nor their governance systems and competence areas to promote a circular economy. This will only occur gradually.

[48] WWF/ZSL, 2017. Living Planet Report 2016
[49] D LeBlanc, 2015. Towards an integration at last? The Sustainability Development Goals as a network of targets. Wiley

- An **annual volume of 400 000 tonnes** of ELT infill would need to be attempted to be re-routed to energy recovery if the polymeric infill application would be banned.
- **A ban would also stop the recycling of ELTs for infill.** This would cause a problem in Member States, as the amount of ELT tyres that would not be recycled would be significant. Adverse effects for other ELT applications can also be expected due to the strong signal of ban for infill could has in other markets.
- Without substantial ELT recovery, **domestic employment and growth opportunities from re-using tyre derived materials will be lost.**

Implementation of Containment Measures is possible

The industry has developed and implemented standards and this development has accelerated during the last few years

- One prominent example is the European Standardisation Organisation (CEN) technical report CEN/TR 17519[50], CEN members are the National Standards Organisations in Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.
- Voluntary environmental certifications systems such as the Eco Management and Audit Scheme, ISO 14001:2015 developed by the European Commission [51] (EMAS) are also used to certify that artificial turf football pitches are installed correctly. The purpose of these schemes are that the installations and organisations responsible for maintenance, have processes in place and the competence to carry out those processes correctly.
- CERUB[52], Circular Economy Rubber, a Certification system that was developed as a response to the concerns regarding mismanagement issues of football pitches with ELT infill, is another prominent example. The CERUB label indicates that the rubber produced from used tyres is produced and delivered to the market in a responsible way. It means that the legislative, health and environmental risk recognition and management is the priority value in material production and includes taking responsibility for the delivery of applicable information for safe use of the material. CERUB was established 2019 by legislated non-profit tyre producer responsibility organisations in Finland, Norway, Sweden and the Netherlands. In 2020 CERUB started expanding out into other European countries. The CERUB system certifies the entire value chain, including the part responsible for maintenance processes and competence.

[50] PD CEN/TR 17519:2020 Surfaces for sports areas. Synthetic turf sports facilities. Guidance on how to minimize infill dispersion into the environment
[51] https://www.unisport.com/artificial-grass-football
[52] www.cerub.org

- National football associations that provide standards and guidelines, such as the Swedish Football Associations, Maintenance of Artificial Football Turf Pitches[53] as well as for Green Public Procurement[54] (GPP)
- In France almost 70 % of the installed artificial turf follows the NF P 90-112[55] standard which covers, not only the artificial grass layer but also the sub base, the drainage and the water collecting system, a system that is now a Special Technical Specification for all new pitches.
- Germany with the DIN 18035-7[56]
- Italy with the LND Regolamento I Campi da Calcio in "erba artificiale"[57]
- European Committee for Standardisation CEN TC 217[58]

Green Public Procurement is being promoted by the artificial football turf sector as well as by City Councils

- City councils are already advancing and are working with the industry regarding Containment Measures. In 2019[59] a County Council in Norway put out a Prior Information Notice regarding the procurement of environmentally friendly artificial grass focusing on the risk of ELT infill spreading to the environment. This Prior Information Notice is now being reviewed by other countries, as a model for green procurement. For instance, by Scotland[60]
- In France, the city of St Cloud[61] has issued requirements and provisions for transforming existing artificial turf pitches, to pitches with Containment Measures.
- The Football Foundation in Scotland nominates awards for the green procurement of Artificial turf football pitches.

GPP Frameworks are already commonplace and a promising path.

- The Scottish Government concluded in their study[62] that Procurement frameworks are already commonly used in the artificial turf pitch procurement process.

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53 SvFF 2017 Rekommendationer för anläggning av konstgräsplaner (Recommendations for installation and management of artificical football turf pitches),

54 SvFF 2015 Att tänka på inför köp/upphandling av konstgräs (to consider when purchasing Artificial turf)

55 Association Francaise de Normalisation, Sports Grounds - Unbound Mineral Surfaces For Outdoor Sport Areas - Specifications For Construction, 2016

56 DIN (2017) Sports grounds - Part 7: Synthetic turf areas

57 FIGC, Lega Nazionale Dilettanti, Regolamento è stato deliberato dalla Commissione Impianti Sportivi in Erba Artificiale (C.I.S.E.A.)

58 CEN, European Committee for Standardisation, TC 217 "Surfaces for Sports Areas"

59 https://ted.europa.eu/TED/notice/udl?uri=TED:NOTICE:158306-2019:TEXT:EN:HTML

60 Mapping Economic, Behavioural and Social Factors within the Plastic Value Chain that lead to Marine Litter in Scotland, Artificial grass pitch report, The Scottish Government, September 2019. page 32

61 Rénovation du terrain de football synthétique et de son éclairage - Cahier des Clauses Techniques et Particulières. Commune De Saint-Cloud, 2020.

62 Mapping Economic, Behavioural and Social Factors within the Plastic Value Chain that lead to Marine Litter in Scotland, Artificial grass pitch report, The Scottish Government, September 2019. page 30

- The report reviews solutions for infill losses and concludes that Green Public Procurement frameworks as well as education and accreditation are more appropriate solutions than a Ban[63]. See figure below.

Life cycle stage	Key decision point	Green procurement framework	Accreditation	Education	Funding	Guidance	Eurocode Legislation	ECHA Ban
Production	Product design	✓	(✓)	✓	✓	✓	✓	(✓)
Retail	Procurement decision	(✓)	✓	(✓)	(✓)	(✓)	✓	✓
Use	Maintenance decision	✓	✗	(✓)	✗	✓	(✓)	✓
End of life/recovery	Waste management decisions	(✓)	✓	✓	✗	✓	(✓)	✗

✓ = Yes, ✗ = No, (✓) = Yes - if solution designed with this in mind, ? = Unknown

Table 1. Artificial turf pitches, where solutions can most influence key decision points (Scottish government, 2019

The tyre industry made a strong commitment to reducing and eliminating ELTs going to landfill by issuing a ´Producer Responsibility´ principle in the 1990s It also created ELT-management companies across Europe which continue today.

- As a response to the problem of tyres being dumped in nature, pre 1990, the European Tyre industry implemented the Extended Producer Responsibility system- Today, non-profit End-of-life tyre companies (ELT´s) that administer this producer responsibility are active across Europe. This is a pro-active sector.
- The recycling of tyres is recognized for its success with an over 95% collection rate and a 62% material recovery rate. With regulatory and market imperfections addressed, this could be increased.

- These ELT´s monitor the environmental performance of recycling closely and fund research that further enhances the knowledge and improve the practices. The list of research funded or initiated by ELT companies is long, and includes:
  1. Water purification in ground beds with tyre shreds (2018)
  2. Life cycle Assessment (LCA) for artificial turf and rubber asphalt (2018)
  3. Rubber asphalt-technical and commercial conditions (2018)
  4. FoBIG-European study on possible health issues/artificial turf pitches using recycled rubber tyres (2018/19)
  5. Kalmar-state-of-the-art artificial turf pitch with minimisation of spill (2019)
  6. The development of the CERUB Certification system (2019)
  7. Examination of the impact of puncture fluids on the environment (2019)
  8. VTI project on microplastics from tyre and road wear (2020)
  9. LCA on 9 recovery methods (2010)

[63] Mapping Economic, Behavioural and Social Factors within the Plastic Value Chain that lead to Marine Litter in Scotland, Artificial grass pitch report, The Scottish Government, September 2019. Page 28

There has been a breakthrough for artificial turf infill with benefits to public health, the environment and are a good match between the material and the requirements.

- Inactivity amongst the European population has increased, especially among children and adolescents and the importance of facilitating opportunities for increased activity, and the large socioeconomic gains of community football, UEFA quantified each invested Euro provide 10 Euro back return to society[64]. There is an increased demand for artificial football turf pitches and the provision of additional pitches are a resource effective contribution to solving this problem. Artificial turf football pitches are designed in a way, that when managed well, usage is maximised.
- The use of ELT infill reduces the environmental impact of new raw material extraction. Artificial turf pitches create one of the most available and accessible forms of exercise hours, per individual, that our society provides and in a safe and sustainable way.
- The recycled ELT products reduce and, in some cases, can even negate, the need for additional raw material to be extracted. Many parameters of end-of-life tyre granules (SBR) are considered to be advantageous. For example:
  - ELT infill gives off less dust
  - Does not float
  - Is long-lived
  - Is easy to manage
  - Helps protect the players from injury
  - Lasts longer

- The criteria for NOT replacing this with new raw material is clearly met when compared with EPDM, TPE[65] and cork. Sugar cane infill and the wastage from logging can be considered residual and not raw material, however, these materials are new for infill and their performance - and environmental benefits, from a Life Cycle Analysis perspective is still unknown.

- The ELT infill granules are safe for both health and the environment. The latest scientific studies in this field show that there are no associated health problems with ELT infill and that previous concerns about leaching and microplastics have been misrepresented, misunderstood and hugely exaggerated. Research, such as the studies by FoBig[66] [67] [68] was not available for the Eunomia researchers who expressed some concerns. Actual measurements in drainage systems and on players clothes and football boots, show a low risk of small and manageable amounts of granules

[64] UEFA GROW SROI – Social Return on Investment, May 2018
[65] TPE – Thermoplastic Elastomer
[66] European Risk Assessment Study on Synthetic Turf Rubber Infill - Part 1: Analysis of infill samples, The Science of the total environment, Science of The Total Environment, February 2020
[67] European Risk Assessment Study on Synthetic Turf Rubber Infill – Part 2: Migration and monitoring studies, Science of The Total Environment, February 2020
[68] European risk assessment study on synthetic turf rubber infill – Part 3: Exposure and risk characterisation, Science of The Total Environment, May 2020

leaving the pitches[69] [70] [71]. The risk for larger amounts of granules leaving pitches, for example through careless snow removal, can be prevented by tipping it on to a surface specifically intended for the melting of snow and then collecting any granules. Overall, the risks are small and manageable.

- The Swedish Environmental Institute, IVL, conducted an LCA in 2012[72]. The results showed that ELT infill has less overall environmental impact than the alternatives EPDM, TPE and cork. A more recent study by Ragn-Sells[73] concurs with these findings and shows that Cork has slightly higher CO2 impact due to its transport from the cultivation sites. Cork also has a much higher agricultural land use (equivalent to 130 football pitches in size for supplying one pitch with cork for 10 years). LCA-comparisons cannot be made regarding sugar-cane, logging residue or natural grass alternatives as they are still trial products. Regardless of this, it is fact that these three options are all subject to cultivation, irrigation, process, transport and weed control. There is also considerable uncertainty about whether these materials will meet the functionality levels required and allow for intensive use in an artificial turf football pitch. ELT Infill is the best performer in terms of overall environmental impact.
- ELT infill offers significant environmental benefits as it is both resource efficient, fits into a circular economy and is well suited for the use with artificial turf. It makes use of the materials Europe already has in circulation. Due to Earth's limited resources this is an unavoidable part of the need for a future that is sustainable. From a resource decoupling, phosphorus and land use savings perspective, artificial turf with ELT infill offers environmental benefits over and above existing alternatives and is a leading example of a circular economy material re-use which is highly relevant for Europe. Land-system change (land usage related to resource extraction and human activity) and the Phosphorus cycle for Europe has gone beyond[74] its share of global safe operating space[75]. In addition to this, Biosphere integrity and Climate Change are planetary boundaries which are also trespassed by Europe. All these planetary boundaries are sustainability aspects where ELT performs very well in comparison to other raw materials, regardless of they are fossil or organic. In addition to this, an organic material typically needs to be treated with an antimicrobial application[76] to prevent its deterioration when used as infill and disperses any added chemical rapidly. These substances will spread into the

[69] H Løkkegard, et al, 2019 Teknologisk Institut

[70] M Møllhausen, et all Sjekk kunstgressbanen [Check the artificial turf pitch] - Rapport fra undersøkelser om svinn av gummigranulat fra kunstgressbaner, gjennomført av over 12 000 elever og spillere høsten 2017. Forskningskampanjen

[71] Regnell 2019; Dispersal of microplastic from a modern artificial turf pitch with preventive measures Case study Bergaviks IP, Kalmar

[72] Livscyckelanalys på återvinning av däck, IVL 2012

[73] K Johansson, 2018, LCA granulat för konstgräsplaner Ragn-Sells AB

[74] Bringing EU policy into line with the Planetary Boundaries, SEI 2017

[75] J Rockström, et al, 2009. A safe operating space for humanity, Nature vol 46.

[76] This is also referred to in the Annex to Background Document to the Opinion on the Annex XV dossier proposing restrictions on intentionally added microplastics e.g. on page 372

environment and could have an impact on health and the biosphere. This is something ELT infill does not require.

- ELT can be recycled many times over which also saves additional CO2 emissions being released in to the environment.
- Most often the product can be reused on new artificial turf or it can go to new types of products, such as moulded rubber products and rubber asphalt. After 10 years of use, around half of the ELT infill can be recycled and replaced with newly granulated ELT, and the other half can still remain in use as artificial turf infill.
- The majority of Europe's artificial turf pitches are local council or community owned. The councils have the capacity and ability to manage artificial turf pitches themselves and/or in collaboration with local football clubs. It is important that the responsibility for the pitches is clarified and that there are clear instructions for installation, use, operation, maintenance and recycling.
- The certification for ELT infill, CERUB[77] will further the advancements on responsible recovery and delivery of the material. The certification also requires that measures are taken to minimise spillage and that the responsibility for the pitch during and after its life-span is regulated.
- The use of ELT on artificial turf also creates local employment, aids economic growth opportunities and ELT has a high resource efficiency. As European and Member States better adapt their regulatory environment, allowing for durable, safe materials such as ELT, to be put to use in more than one recycled application, these benefits will continue into the future, decoupling growth from resource extraction.

ELT has been successfully recovered for over 20 years of without a single environmental problem, demonstrates industry´s commitment

Since the instalment of ELT companies in Europe, the landfill of tyres has been eliminated. A success that shows the industry commitment to tackle issues of ELT infill. Substantial resources have already been allocated to both further the knowledge in this area and implement new initiatives to analyse and clarify any remaining concerns.

Up to 80% of the market would need to be replaced

ELT infill has been estimated[78] to be 75-80 % (400 000 tonnes) of the overall European infill volume. The dossier submitter figure of 100 000 tonnes incorrect.

All infill spread should be contained.

Whether it concerns polymeric infill or any other kind of infill, spread to the environment should always be limited. This means that any foreign contaminant in the soil or any other

[77] https://cerub.org

[78] facts about climate and environmental benefits, Genan. Version July 2020.

area should be minimised. Even ´natural´ infill materials would be considered foreign to the environment and would need to have mitigating measures in place to prevent spread.

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A ban on ELT infill would require the existing football pitches infill be discarded and replaced, adding financial burdens to communities across Europe, a lot of whom are already financially challenged and this will impact upon community football.

In the event of a ban this negative effect will spread rapidly, regardless if the ban comes with a delay or not. This is also concluded by ESTC and EURIC in their reports.