Workshop for the purpose of the REACH Annex XV dossier for a restriction on plastic and rubber granules used as infill material in synthetic turf pitches

24 November 2017, Ministry of Infrastructure and Water Management, The Hague (Netherlands).

Chairman summary

The workshop was organized by RIVM and ECHA for the purpose of collecting relevant information for the preparation of a REACH Annex XV Restriction dossier on plastic and rubber granules used as infill material on synthetic turf pitches and to ensure that information received in response of the call for evidence organized by ECHA (23 August-18 October 2017) is interpreted correctly. 42 Stakeholders attended the workshop, coming from a variation of organizations such as tire recyclers, tire manufacturers, synthetic turf manufacturers, academia and alternative manufacturers.

The workshop was chaired by Joke Herremans, head of the department on Consumer Product Safety within RIVMs Centre for Safety of Substances and Products (VSP). Joke welcomed the attendees and explained the purpose and conditions of the workshop which was held under the Chatham House Rule: *When a meeting, or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed.*

At the start the attendees were given the opportunity to introduce themselves and their organisation and give a position statement regarding the use of granules as infill material on artificial turf pitches. Position statements received on paper were distributed to all attendees after the workshop together with this Chairman summary, list of attendees and the PowerPoint presentation used to introduce the discussions.

RIVM started with giving an explanation of the process of developing this Annex XV dossier and the restriction proposal, the steps that yet are to come and the possibilities for interested parties to contribute to the process. The introductory presentation is available as an Annex to the Chairman summary.

The workshop discussions were held by 4 themes. The chairman summary of the main issues discussed is presented below.

<u>Theme 1: Risk of granules used on synthetic turf pitches</u>

The scientific basis for the Annex XV dossier initiative and drafting a restriction proposal is the finding of both RIVM[1] and ECHA[2] that the current limit for PAHs in mixtures[3] supplied to the general public seems not to ensure adequate protection of human health if the PAH-levels in granules used on synthetic turf pitches would be as high as currently allowed. The restriction proposal will aim to limit the PAH content in granules to a level of control of risks. The RIVM risk assessment will be used as a basis for the risk assessment section of the Annex XV dossier. Additional information obtained from

[1] Evaluation of health risks of playing sports on synthetic turf pitches with rubber granulate: Scientific background document. DOI 10.21945/RIVM-2017-0017

[2] Annex XV Report: An evaluation of the possible health risks of recycled rubber granules used as infill in synthetic turf sports fields, ECHA, 28 February 2017.

[3] Entry 28 of REACH Annex XVII prohibits the placing on the market for supply to the general public of substances or mixtures containing equal to or more than 0.1 weight percent (1000 mg/kg) of the PAH that are in the scope of entry 50 of Annex XVII. For two PAHs (Benzo[a]pyrene (BaP) and Dibenzo[a,h]anthracene (DBAhA) the limit is 0.01% (100 mg/kg).

the ECHA report, submitted by stakeholders during the consultation and from other sources, will be used to update and improve the assessment where deemed appropriate.

A key question scheduled for discussion was whether the yet available data on actual PAH content in infill material are representative for the EU. The workshop did not provide a clear answer to that question. However, it was said that PAHs concentrations in tires and end-of-life tire (ELT) granules appear to be relatively stable and have gradually been reduced over time due to the extender oil restriction that entered into force in in the EU January 2010. The PAH restriction in extender oils used in tires placed on the EU market was said to have taken effect already before the 2010 legal deadline. Differences in PAHs concentrations reported might occur for various reasons: 1. Variability of PAH recovery dependent on the analytical methods applied to determine PAH content; 2. Use of non-tire rubber materials and articles for manufacture of granules; 3. Use of older car or truck tires or non-automotive tires to manufacture granules. 4. Use of imported tires that do not comply with the EU extender oil restriction to manufacture granules and; 5 Import of waste tires or granules from non-EU regions. Several studies looking at PAHs content in infill are ongoing and relevant information will be provided once available. Various attendees stated that there is not expected to be a difference in PAH content between ELT infill produced using a cryogenic process compared to the manufacture process at ambient temperature. Furthermore it can be questioned whether ELT infill is imported from outside Europe as this is not expected to be cost effective (transport costs).

The discussion continued by exploring relevant exposure scenarios for the risk assessment. It was explained that the exposure scenarios used in the reports from RIVM and ECHA will be used as a starting point for the restriction dossier. In these reports the focus on football field players and goalkeepers age 4-50 years that are orally (incidental ingestion) and dermally exposed to granules. The ECHA report also covered inhalation exposure. Some comments were made related to assumptions made in the exposure scenarios in the earlier studies of RIVM and ECHA (e.g. related to the amount of oral ingestion of granules as a consequence of playing on the pitch). Some attendees stated that all relevant exposure scenarios should be included in the risk assessment and an exposure scenario specifically for very young children (0-4 years of age) needs to be included in addition to the earlier work. Such scenario would account for little children playing on mini-pitches where granules may also be used. No clear preference was given to include a scenario looking to exposure via wounds. However, it was proposed to consider if some inspiration from the nickel REACH restriction can be taken (separate migration rates for post assemblies (in contact with blood) compared to other articles). It was mentioned that FIFA and UEFA have surveys of abrasion. Preference was expressed to account for migration rate in the exposure assessment and the fact that migration is related to surface size of the granules and the type of material. Furthermore it was said that the dossier should somehow account for other sources of PAHs as well that are said to be of importance for total human exposure to PAHs. However, the attendees did not provide details on how such background PAH exposure should be addressed. It was announced that additional information will be provided to evaluate the need for an extra assessment factor in the hazard assessment for children (age 4-10).

<u>Theme 2: Scope of the restriction and restriction options</u>

Taking into account the existing REACH restriction, entry 50 on PAHs in articles[4], we are considering to propose an additional REACH restriction on eight carcinogenic PAHs in plastic and rubber granules used as infill material in synthetic turf pitches. It is asked whether extension of the scope to other

[4] The placing on the market for supply to the general public of articles containing polycyclic aromatic hydrocarbons (PAHs) is restricted by entry 50 of Annex XVII to REACH Regulation (EC) No 1907/2006, paragraphs 5 and 6. Articles placed on the market for supply to the general public will contravene the restriction if any of their rubber or plastic components that come into direct as well as prolonged contact or short-term repetitive contact with human skin or the oral cavity, under normal or reasonably foreseeable conditions of use, contain more than 1 mg/kg (0.0001% by weight of this component) of any of the eight PAHs that are identified in Column 1 of the entry. Toys, including activity toys, and childcare articles, should not contain more than 0,5 mg/kg (0,00005 % by weight of this component) of any of the listed PAHs. Guidance for the interpretation of entry 50.5 and 6 is under development.

(carcinogenic) PAHs would have an added value. The general impression from the workshop is that this has no added value, as the 8 PAHs are expected to be representative (markers) for other PAHs as well and contribution from various PAHs are more or less constant. Broadening the scope is said to overcomplicate the issue with little or no added value for the risk assessment and the final restriction proposal. It however, is stated that it is important to also consider hazardous effects, other than carcinogenicity and that this might require broadening of the scope. This could for example include hazardous effects of lower molecular weight PAHs. Additional information related to these other hazardous effects was welcomed by the chair.

Related to the scoping of the restriction proposal, it was asked what infill materials should be included. The general idea among attendees is that the scope should not only embrace infill made of ELT, but also infill made out of other materials, regardless whether these are made from recycled or virgin materials as the aim is to ensure safe use of artificial sport grounds, independent on the material they are made of. It was even questioned whether also infill made of natural resources (like cork) and 'non-performance' infill like sand, should be included in the scope. Defining the scope by covering all 'performance infill layer' following the FIFA definition might be a solution to find a relevant scope. The discussion further clarified that the use of definitions in the restriction text requires further attention when setting the scope. E.g. the term 'plastics' was said to be not a clearly defined term and it is better to use the work thermoplastic and rubber if that scope is chosen for the proposal.

Some attention was given to the question whether infill is defined as mixture or as article and whether there is a difference between infill made from ELT and infill from other (virgin) resources. There is no clarity on this issue voiced by various attendees and a request/hope to clarify the issue through this new restriction proposal. Some infill materials (not being ELT granules) were by some of the attendees said to meet the definition of an article. Various actors in the field prefer infill to be articles instead of mixtures, however, at a limit value that accounts for risk. Furthermore, the issue of potentially having various limit values for various parts of the artificial grass system is flagged, as the restriction proposal is on PAHs in infill only and the current limit values for PAHs in articles already applies to the artificial turf itself (and other articles supplied to the general public).

The starting point in setting the limit value is to choose a value that will ensure protection of human health. Hence, the human health risk assessment will form the basis for the proposed limit value. As RIVM and ECHA are still working on the risk assessment of PAHs in granules, it is currently not known at what the proposed limit value will be. It should be noted that as a result of the evaluation by the scientific committees of ECHA (Risk Assessment Committee (RAC) and Socio-Economic Analysis Committee (SEAC)) that follows after submission of the restriction proposal by the Netherlands, changes in the dossier may be considered necessary. This might include changes to the limit value that is proposed in the dossier. In the discussion, various actors stated to prefer a sum limit for 8 PAHs instead of limits for all individual PAHs as this is more practical for companies and enforcement. It was however questioned whether such sum limit value would account for the risk posed by PAHs with higher potency like Benzo(a)pyrene as well. Furthermore, various actors plead for a migration limit instead of a content limit as this according to them better relates to actual exposure. Concerns were raised related to the extraction and test method used as no standard test method is available and available test methods show significant analytical uncertainty. The wish was expressed to ensure that the limit value is protective for all hazard endpoints, not only the carcinogenicity risk.

<u>Theme 3: Alternatives</u>

Information on alternatives is requested for the restriction dossier because implementation of the restriction measure could result in a shift to alternative infill materials used in artificial turf pitches or in alternative turf pitches to be installed. Three groups of alternatives are defined: 1. Various infill materials; 2. Various grass systems and 3. Techniques to reduce PAH content in infill material.

The term ‘alternative’ appears to be somewhat confusing as the earlier discussion stated that all infill materials used on artificial turf systems should be included in the scope of the restriction proposal. In that sense, it might be better to talk about various infill options and various grass systems instead of alternatives. There was some discussion on correct use of terminology to make sure all infill options and grass systems are properly defined. Furthermore, it was questioned by some actors whether natural grass in group 2 is a real alternative for reason of performance. It was also questioned whether measures to reduce PAHs content in ELT derived rubber granules are in fact an alternative as this might not be possible in practice.

For the dossier it is important to obtain information of potential human health and environmental hazards of ‘alternatives’, as we want to avoid that a shift to alternatives would give rise to other concerns to human health or the environment. Some information comparing impacts of alternatives was said to be available and will be provided to RIVM, including a life cycle analysis. It is stated that this analysis should not only pay attention to hazardous chemicals, but also to other environmental problems (like climate change and use of resources). It was said that the variety in quality in alternative infill material is much larger compared to infill made from ELT and that there may be or in future come alternatives on the market form Asia that are of low quality and including chemicals that can give risks. Chemicals can also be used during use and maintenance of different types of pitches, e.g. to protect the artificial grass or the infill material from bacterial or plant growth. Not much information on this seems to be available, also not on differences between various types of pitches and types of infill. It however, was said to be more likely to use chemical treatment in case of natural infill, as e.g. cork is more susceptible to algae.

Also other characteristics of alternatives were discussed. Sports technical performance, intensity of use, characteristics in extreme climates (high temperatures), maintenance needs, life-time, availability and costs were mentioned. It was stated that the aspects length of infill service life (durability) and maintenance are important issues. Also costs were stated to be very important as the choice for new pitches is mostly based upon a tendering procedure having costs as the most important factor in the decision what field to choose.

The question is raised what alternatives are promising. In response to this it was said to look at those systems that have already proven themselves. EPDM and TPE are alternatives that are used. PE is an upcoming infill material. Also mixed infill can be used in practice. Alternative systems are developed to require less infill material for reasons of costs (the virgin infill material is more expensive than ELT rubber infill). Alternative systems often use shorter grass piles compared to ELT based system and often make use of a shock pad/elastic layer below the artificial grass that can for example be made out of ELT and PU.
Artificial turf systems without infill are currently not complying FIFA criteria. Various views exist whether such non-infill systems will be able to comply with the criteria in the future. Main issues here are wounds by slidings and rotation characteristics of the system. However these non-infill systems may be in use for mini pitches or playgrounds.

Currently, not many alternative producers are active on the market, because the market for alternatives is small. If the market requests for alternatives, this will become a growing market. However, time and investments are needed adapt to such a change. In some states in the US already shifted to alternatives and can provide indications of the required time for industry to adapt to that. In Europe a shift to alternatives is observed in The Netherlands and Sweden. It was said that at current capacity, full replacement of ELT infill by alternatives is not yet possible, but within some years this could be feasible.

Theme 4: Socio-economic effects of a restriction

The Annex XV dossier will contain a socio-economic analysis (SEA) in which the costs and benefits of the restriction options are analysed and compared to the business as usual scenario (baseline). The SEA aims to provide information to conclude upon the proportionality of the proposed restriction by comparing societal benefits and societal costs of the measure(s). In the discussion, first the baseline situation is discussed. This is the current situation without introduction of the restriction proposal. Some information was shared related to the estimated number of artificial turf football fields in the EU and the market share of various types of infill that are currently used. Expected trends were discussed. The number of artificial turf pitches is expected to grow. The number of mini-pitches may be growing faster than the number of football fields, as this market appears to be less saturated. However, it is not very clear whether this is an EU wide trend or whether this is the situation for some specific EU countries. Furthermore, currently, ELT infill is dominant on the EU market (estimated around 90% of all infill used), however, there are said to be differences among EU countries. (Non-ELT) alternative infills are expected to grow in the baseline situation. Mini-pitches are smaller compared to football fields (estimated around $1/10^{th}$), however, these may become large in numbers and are used for various purposes by both adults as children. Mini-pitches may both be situated outside and indoors. They are often expected to be owned by local governments but may also be private owned.

There was some discussion on the recycling of used infill material. Recycling may be possible for various infills and could become a growing market as the first artificial turf pitches are currently renewed.

Related to the number of people that come into contact with artificial turf pitches (and hence with infill material), an estimate can be made from EU residents involved in football. In some EU countries other sports also use the artificial turf pitches and these needs to be included as well. However, other users of example mini-pitches are more difficult to make. It was suggested to make an estimate based on the expected number of fields in the EU. Furthermore it was raised not to forget schools using the fields for their sport activities.

The potential consequences of various limit values of PAHs were discussed, as currently it is not known what limit value will be proposed as it will be based on the risk assessment that is currently ongoing. What is expected to happen of course largely depends on the value of the limit value. There was agreement among actors that a limit value similar to the current PAH restriction on articles would stop the use of infill made of ELT as current PAHs concentrations are higher and are not expected to significantly reduce in the future. There are different views on what values can be met currently. What limit value can be met largely depends on the test method used, and attendees request for clarity on this in the restriction proposal.

Tire recyclers state to get problems when the limit value is too low. Infill is said to account for around 30% of their market and that market would then be lost, resulting in job losses and losses in revenues. In addition they state that recycling targets will not anymore be met. However, a strict limit value would increase the market of alternative manufacturers. Some actors also expect wider effects of a strict limit value as social unrest might result in pressure replacing existing fields if they appear to contain higher PAH values. This may be an imported secondary effect of a restriction proposal that normally only is aimed towards supply and use of new materials. Such secondary effect might increase market impacts significantly and will put financial burden on sport clubs and local municipalities that own the pitches as well. It was stated that the sector will not wait for action until the restriction is actually entering into force. Probably stakeholders may already start acting as soon as the (draft) restriction proposal is published. In that sense the required transition period may be short. However, this of course also depends on the limit value that is proposed.

Programme workshop 24-11-2017

Chair: Joke Herremans (RIVM)

9.00	Welcome and purpose of the workshop
9.15	Tour de table
9.45	Introduction on the Annex XV dossier and the discussion of today
10.00	Theme 1. Risk of granules used on synthetic turf pitches
11.15	Theme 2. Scope of the restriction and restriction options
12.30	Lunch break
13.30	Theme 3. Alternatives
14.45	Theme 4. Socio-economic effects of a restriction
16.00	Summary of discussions
17.00	Closure, drinks
17.30	End of the meeting

List of participants

Berleburger Schaumstoffwerk GmbH	Hans Ulf Poeppel
BIR, Recybem	Barend ten Bruggencate
BSNC/Sekisui Alveo	Frenk Stoop
Celanese	Gesine Fickel
Conradi+Kaiser GmbH	Michael Winkelmüller
Conradi+Kaiser GmbH	Klaus Kaiser
ECHA	Kirsi Sihvonen
ESTO	Alastair Cox
ETRA	Ettore Musacchi
ETRMA	Laia Perez Simbor
ETRMA	Marco Nahmias
ETRMA	Daniele Formai
ETRMA/NVR	Alex van Gelderen
European Commission	Enrique Garcia John
Federazione Nazionale Gioco Calcio	Manuela Cortese
Fraunhofer	Ludwig Gruber
Genan	Daniel Schokmann
Granuband	Jan Aufenacker
International Carbon Black Association	Gerrit Höhfeld
Kempeneers-Milieu	Frank Kempeneers
Labosport	Pascal Haxaire
Ministry of Health, Welfare and Sport	Jurgen van Belle
Ministry of Infrastructure and Water Management	Cees Luttikhuizen
Ministry of Infrastructure and Water Management	Carsten Wentink
Polytan GmpH	Rutger Schuijffel
PVP Triptis GmbH	Susanne Madelung
Ragn-Sells	Sara Stiernström
RecyBEM/Band en Milieu	Frank Hopstaken
RIVM	Richard Luit
RIVM	Martijn Beekman
RIVM	Joke Herrremans
RIVM	Julia Verhoeven
RIVM	Anja Verschoor
RIVM	Arianne de Blaeij
Rumal	Jan van den Brand
Sekisui Alveo	Klim Geraedts
SGS Intron	Ulbert Hofstra
Stirling University	Andrew Watterson
Ten Cate grass holding	Bart Wijers
Terra Sports Technology	Mario Smit
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