Comments on the SEAC draft opinion

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| **Ref.** | **Date/Name/Org.** | **Comments** |
| 412 | **Date/Time:** 2019/07/19 13:49  **Type:** BehalfOfAnOrganisation  **Org. type:**  Industry or trade association  **Org. name:**  ETRMA - European Tyre & Rubber Manufacturers Association  **Org. country:**  Belgium  **Attachment:** | **Comments on the SEAC draft opinion:**  End of life tyres (ELT) derived rubber are the main source of raw material for recycled crumb rubber. It has proven to be a reliable material able to reply to the demanding technical requirements of infill of synthetic turf fields (STF), to mention, STF represent approximately 30% of the ELT derived rubber market. Using ELT derived rubber for infill of STF closes the recycling loop of tyres and helps Europe to meet its circular economy targets. On the other hand, tyres are highly technical and strictly regulated products that need to meet specific requirements for their performance. Several types of rubber with specific chemical composition are needed in order to meet those requirements. Polycyclic Aromatic Carbons are impurities of extender oils and Carbon black, raw materials used and needed in Tyre production.  The study ERASSTRI - European Risk Assessment Study on Synthetic Turf Rubber Infill – is assessing the exposure and potential risks to human health associated with the use of ELT derived rubber in synthetic turf fields. The study is lead by consultant FoBIG, supported by Eurofins and Labosport ,  ERASSTRI is sponsored by ETRMA and members of the Crumb Rubber Industry Platform, CRIP, that includes granulators, installers, the European Synthetic Turf Field Organization and other relevant actors of the crumb rubber value chain. The study was conceived as independent study. The results will be published and disclosed in a scientific journal and ideally peer reviewed. The study has the advice of an established Scientific Advisory Board from academia composed by: Professor Nowak, from Munich University; Prof. Deruti, from Polytechn Milano and Prof. Bordado from Lisbon’s university.  ERASSTRI main objective is developing a comprehensive human health exposure and health risk assessment of chemical exposure originating from the use of crumb rubber from end-of-life tyres, as infill material for synthetic turfs fields.  The details of the study were shared with ECHA during the 1st public consultation. The results showed that for uncoated ELT derived granules from sport fields, the content in weight of the sum of the 8 REACH PAH ranged from 2.77 mg/kg to 53.41 mg/kg with a median value of 8.47 mg/kg. All the 67 samples except from one were below the proposed threshold of 20 mg/kg for the sum of the 8 REACH PAH proposed by the Risk Assessment Committee and the Socio-Economic Assessment Committee Draft opinion.  ETRMA would like to raise to the SEAC´s attention essential considerations for a successful restriction proposal. |
| **SEAC Rapporteurs response:** |
| 413 | **Date/Time:** 2019/07/22 19:28  **Type:** BehalfOfAnOrganisation  **Org. type:**  Industry or trade association  **Org. name:**  European Synthetic Turf Council  **Org. country:**  Belgium | **Comments on the SEAC draft opinion:**  The European Synthetic Turf Council (ESTC) is a non-profit trade association representing European 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 ESTO has 80 members and further details may be found at https://www.estc.info.  ESTC welcomes and supports the proposal of the Committee for Risk Assessment (RAC) and Committee for Socio-economic Analysis (SEAC), as detailed in their Opinion Report dated 14 June 2019, that granules (or mulches) shall not be placed on the market for use as infill material in synthetic turf pitches or in loose form on playgrounds and in sport applications if these materials contain more than 20 mg/kg (0.0020 % by weight of this component) of the sum of the listed PAHs.  Based on all of the scientific data we have seen, including the very comprehensive study recently completed by the European Risk Assessment Study on Synthetic Turf Rubber Infill (ERASSTRI ) project, ESTC believes the proposed restriction is appropriate and proportional in terms of protecting and reassuring the users of synthetic turf fields, whilst at the same time, not causing unnecessary concerns and problems to the operators of the many thousands of synthetic turf fields across Europe, that could occur if a restriction was introduced that excluded end of life tyre infill from the European market. The data available from our members and from the ERASSTRI study shows that vast majority of European producers of synthetic turf infill materials are already supplying materials that are achieving the proposed restriction limit, which is due to them taking a proactively responsible approach and only using REACH compliant tyres as their feedstock. The proposed restriction will therefore allow the sustainable disposal of European produced tyres to continue in a way that provides a cost effective and durable infill material.  We would like to restate that in our opinion, ensuring there is a reliable test method with proven reproducibility and repeatability is essential for any REACH restriction to achieve its objective of keeping unacceptable materials out of the supply chain. At present different laboratories or national restrictions are using a variety of test methods to determine the PAH content of infills and experience is showing that different test methods give different results and the reproducibility of some methods is unacceptably poor. At present we believe the German test method AFPS GS2014:01 PAK2 is most commonly being used.  We also note the report mentions sampling of infill and we agree with the need for this to be undertaken in a consistent and representative way. ELT derived infills do not have a homogeneous chemical composition as the feedstock from which they are produced are not homogenous tyre to tyre, or even across a single tyre as each layer has a specific technical function This means a sample lot of granulate could have a variety of different chemical compositions and as the sample specimen required for chemical analysis is very small, ensuing the sample is statically representative of the sample lot is very important. Recognising the need for an internationally harmonized protocol for the collection of infill samples from production or from site during the construction of a sports field or from existing fields, a Code of Practice for the sampling and preparation of infill for chemical analysis is being prepared by CEN TC 217 WG6, TG1. The draft is currently available for pubic comment and it is hoped the European Standard will be published in early 2020. We encourage REACH to make reference to this document in the new Restriction. |
| **SEAC Rapporteurs response:** |
| 414 | **Date/Time:** 2019/08/16 08:55  **Type:** BehalfOfAnOrganisation  **Org. type:**  Company  **Org. name:**  Celanese  **Org. country:**  Netherlands | **Comments on the SEAC draft opinion:**  Celanese would like to note that the cost per artificial turf system with infill as listed in Table E 18 of the RAC SEAC document (page 220) do not sufficiently include all costs that should be taken into consideration:  • Costs for waste and especially environmental clean-up in case of soil pollution should be considered as well. The cost of polluted area clean-up and disposal of polluted soil must not be underestimated. The assumption that disposal costs of all artificial systems are identical cannot be correct, as disposal of waste which is polluted with PAH is much more costly than of waste without PAH. Virgin materials that can be recycled will still have more value and therefore disposal is less costly or can give some return on investment.  • Costs for installation of fields differ a lot among member states. In the Netherlands an independent consultancy[1] presented at a public hearing in Helmond installation costs of an artificial turf system with ELT infill of €380.000,- and of an artificial turf system with TPE infill of €440.000,-/465.000,-.  • The shock-pad used in artificial turf systems with TPE infill can be reused. This is a cost saving of €45.000,- upon reinstallation of the field. Therefore reinstallation costs are much lower than installation costs.  Taking into consideration the above points, calculating all costs over a longer period of time and taking into account environmental issues, the cost difference of the artificial turf system with TPE infill compared to the artificial turf system with ELT is not high and could even be zero. Therefore Celanese would appreciate reevaluation of the conclusion on the socio-economic cost effect that is now presented in the RAC-SEAC document.  [1] KYBYS ingenieurs en adviseurs, podiumbijeenkomst gemeente Helmond, "Kunstgras infill: trends, alternatieven en gevolgen", 15-01-2019 |
| **SEAC Rapporteurs response:** |
| 415 | **Date/Time:** 2019/08/16 14:50  **Type:** BehalfOfAnOrganisation  **Org. type:**  Other contributor  **Org. name:**  <redacted>  **Org. country:**  Netherlands  **Company name confidential: Yes**  **Attachment:** | **Comments on the SEAC draft opinion:**  Please see attached document. |
| **SEAC Rapporteurs response:** |
| 416 | **Date/Time:** 2019/08/18 21:18  **Type:** Individual  **Country:**  United Kingdom | **Comments on the SEAC draft opinion:**  I am very concerned about the number of children getting ill after playing on 3G rubber crumb artificial football and sports pitches. Unfortunately some have died and their families have been destroyed for ever.  Children's immune systems are immature, and the younger ones are even more susceptible to illnesses. Their immune systems are not fully mature until they reach the age of about twenty-two.  The proposed toxic limits for PAHs are still much too high for children to be exposed to. Unless you can get the PAH limits down to the same limit as for toys (0.5mg/kg) then children should not be anywhere near rubber crumb artificial football pitches. Rubber crumb infill should never be used on or near school grounds nor homes as the carcinogenic rubber crumb dust will blow all over the area and they will be exposed to this continually. This is neither right nor fair.  It is absolutely ridiculous that children are encouraged to play on rubber crumb infilled pitches. We protect our children with minimum age limits for smoking tobacco and for drinking alcohol, but then let them play on many tonnes of carcinogenic unbound rubber crumb and dust. This makes no sense whatsoever.  These documents show how RIVM was manipulated into reclassifying rubber crumb as a mixture because a multi-billion dollar industry would be at stake! Please consider how many children have become ill and died as a result of RIVM reclassifying rubber crumb infill as a mixture and how many families this has destroyed.  https://corporateeurope.org/en/power-lobbies/2016/10/how-industry-lobbying-got-toxic-artificial-sports-fields-exempted-new-eu-reach  https://bigwobber.nl/wp-content/uploads/osd/20171221/449.pdf  RIVM eventually gives in to the European Commission:  https://zembla.bnnvara.nl/data/files/3233821473.pdf  "The Dutch government adjusted it's position on rubber infill and informed the European Commission as follows:  Message sent January 13, 2015:  Dear Brussels Colleagues,  Regarding the interpretation of entry 50 concerning rubber infill and tiles, we have noted that there are two interpretations and they can both be defended. In our formal reaction the Netherlands has been advocating that rubber infill should be seen as an article. Although we believe that our arguments are okay, we also see that the arguments demonstrating that rubber infill could be seen as a mixture lead to a tenable position. Looking at the situation at present and the complicated situation that has raised, we would like to say that for pragmatic reasons we will not object to an interpretation that for this specific case of rubber infill used in artificial sports fields, the material could be seen as a mixture. We understand that such an approach could be helpful and will facilitate a good and more long term solution in the context of the foreseen review in 2017."  Mark Murfitt, the owner of Murfitts Industries, questions why he is allowed to supply rubber crumb infill:  https://www.telegraph.co.uk/news/2018/06/11/sport-chiefs-fail-warn-players-3g-pitch-cancer-risk/  “The Government and country’s sports authorities have failed to properly warn millions of footballers and rugby players - including children - to limit their exposure to artificial grass pitches containing cancer-causing chemicals, an investigation by The Daily Telegraph has found.  Those responsible for the wellbeing of both recreational and professional players have also failed to ensure so-called ‘third generation’ (3G) facilities comply with regulations governing toxic substances that come into contact with humans, despite having promised to do so.”  “3G pitches | Supplier openly questions the regulations he must comply with  The man who supplied the crumb rubber for the Football Association’s flagship ‘Parklife’ 3G hub has admitted regulations governing cancer-causing chemicals in such infill are “totally illogical”.  Mark Murfitt, owner of Murfitts Industries, branded rules allowing such granules to contain 100 times the amount of known carcinogen benzo(a)pyrene (BaP) than the artificial grass on which they sit - and even the tyres from which they’re made - as “not tenable”.  Under current European regulations, 100mg/kg of polycyclic aromatic hydrocarbon (PAH) BaP is permitted in crumb rubber from recycled tyres because the infill is classed as what is known as a “mixture”."  "Mr Murfitt’s criticism of the classification of crumb rubber were shared by George Tranter, director at Chirolabs, which the Telegraph commissioned to carry out a test of the infill used at the FA’s Sheffield Graves Parklife hub, which opened in October 2016.  Chirolabs’ independent analysis found the rubber complied with EU regulations but would not have done were it to have been deemed an article instead of a mixture.  Questioning the “dubious classification”, Mr Tranter said: “I’d regard it a horrible mixture that should not be made contact with, especially since there is a fine powder that can be easily ingested or inhaled associated with the crumb.””  From RIVM - rubber granulate does not meet the standard for toys:  https://www.rivm.nl/en/rubber-granulate/research-into-rubber-granulate-on-turf-fields-in-2016  "The concentrations of substances in rubber granulate comply with the general European standards for mixtures of substances. If the standards for rubber granulate would apply to consumer products, a large number of the samples would not meet these standards because of the concentration of PAHs. Rubber granulate does not meet the standard for toys.  The current standard for PAHs in rubber consumer products is far more stringent (100 to 1,000 times) than the mixture standard that applies for rubber granulate. Given the nature of the use of synthetic turf fields, even by young children, there is a need from a health perspective for soundly-based standards for rubber granulate."  Environment Agency report - used rubber crumb ceases to be waste, if unused then it reverts to being a waste, therefore rubber crumb is always waste:  https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/321419/LIT\_8273.pdf  "4.1.1 Tyre-derived rubber materials produced in accordance with this Quality Protocol, which are therefore regarded as having ceased to be waste .....  4.1.3 If it appears that the material is being stored indefinitely with no certainty of use, the material will revert to being a waste and waste management controls will apply ..... "  Another Environment Agency report - sample rubber crumb manufacturer's MSDS states that rubber crumb is unsuitable for sports surfaces:  https://www.pharosproject.net/uploads/files/sources/1828/1330040519.pdf  "Applications:  Sports Surfaces  X = Unsuitable"  It is very apparent from the previous official documents that the health and lives of children have been put at risk for many years and that they will continue to be at risk even if the toxic limits are reduced. This is completely unacceptable. Children just want to play football and other sports, to have fun, their health and lives should not be put at risk needlessly.  Adults can choose whether or not to play on 3G rubber crumb sports fields but children are too young to make their own decisions. It is about time that minimum age restrictions were applied for children playing on these fields, the same as for smoking tobacco and drinking alcohol. We have minimum age limits as these activities are dangerous to children so why on earth are we allowing children to play on carcinogenic unbound rubber crumb and dust infilled fields?  Children should only play on safe infill, on hybrid turf, on pitches without infill, on natural grass pitches. There are alternative safer infills, for example coated rubber crumb, cork and coconut husks. Children matter, they are the future, they should not be collateral damage for making money for an industry that has very many much safer alternative uses for rubber crumb.    The use of carcinogenic unbound rubber crumb infill is an enormous public health scandal on a par with asbestos, BSE and the contaminated blood scandals. No government can pretend that they don't know the risks from exposure to rubber crumb.  Your own Annex Report XV shows the cancer risks, for example, Benzene: "Health concerns of benzene are due to repeated dose toxicity, mutagenicity and carcinogenicity. Due to the genotoxic and carcinogenic effects of benzene, no safe level of exposure can be recommended."  Please use the Precautionary Principle and impose these age restrictions and a ban on using rubber crumb infill on or near schools and homes, you will save many lives. |
| **SEAC Rapporteurs response:** |
| 417 | **Date/Time:** 2019/08/18 22:28  **Type:** Individual  **Country:**  United Kingdom | **Comments on the SEAC draft opinion:**  This is a very important question and answer podcast by the tyre industry. It says everything about how tyre dust causes air, environment and marine pollution as well as a more detailed account of the use of ground-up waste tyres that our children play on. It is very interesting.  What they say about using ground-up waste tyres as infill for artificial football and sports fields is particularly enlightening, this is the main reason why I am sending it to you.  Please have a listen:  https://play.acast.com/s/the-fully-charged-show-podcast/65cf8402292c47c3ba910456d93cba33  "FC Live 2019 - What you need to know about particulate & tyre pollution  From our ongoing series of talks at Fully Charge LIVE 2019 at Silverstone. Helen Czerski chairs a lively conversation about particulates and tyre pollution and how governments and subsequent initiatives can help or hinder progress in our most populated of cities."  Please read this, it is the IUCN Report referred to in the above that shocked the tyre industry so much so that they decided to ignore it:  https://portals.iucn.org/library/node/46622  Full article:  https://portals.iucn.org/library/sites/library/files/documents/2017-002.pdf  IUCN  Primary Microplastics in the Oceans: A Global Evaluation of Sources |
| **SEAC Rapporteurs response:** |
| 418 | **Date/Time:** 2019/08/19 11:38  **Type:** BehalfOfAnOrganisation  **Org. type:**  Industry or trade association  **Org. name:**  The Japan Automobile Tyre Manufacturers Association Inc  **Org. country:**  Japan | **Comments on the SEAC draft opinion:**  A. analysis methods  In general, the method should be;  1. Globally utilized  2. More accurate  We believe AfPS GS 2014:01 PAH satisfies #1, as National Institute of Health Sciences in Japan have conducted the survey using this method.  We have to leave #2 to expert as we do not have enough knowledge to judge.  B. Concentration limit  Setting the limit at 20mg/kg instead of 17mg/kg which were proposed by dossier submitter is more  practical from the following point of view.  1. Impact for ELT recycling industry is negligible.  2. Tyres produced in line with Annex XVII to REACH, Entry 50 would not exceed 20mg/kg with reasonable allowance.  We would like to ask the authorities to give special consideration to minimize the cost and time for the report by ELT recycling industry once new limit will be applicable.  C. Exposure scenario    Although we comment B above, we do not think that setting the limit at 20mg/kg is logical enough.  So, we rewrite the comment that we have provided for the first public consultation regarding the scenario as follows.  Setting, reviewing, the limit must be with extremely careful considerations and with complete logic. We should not proceed this issue in haste.  Once the limit is fixed and published with insufficient consideration, a lot of time and effort must be spent when another review will be required.  1. We believe we have time on this issue as the conclusions described on past studies are as follows.  ・ECHA - ‘ECHA has found no reason to advise people against playing sports on synthetic turf containing recycled rubber granules as infill material.  ・RIVM - ‘Health risk virtually negligible.  We understand that there are several uncertainties to be clarified and reviewing the limit to lower side is recommended but this issue is not extremely urgent from those conclusions.  2. This Annex XV restriction report does not seem to be logical enough.  We do not understand the logic to set RO1, 17mg/kg.  We estimate the number of goalkeepers belonging to professional football team as follows.  7,500 goalkeepers from 1,500 teams in the world including 3,500 goalkeepers from 700 teams in Europe. （Professional football teams usually have 4 to 5 goalkeepers）  If a goalkeeper can play in professional football team for 10years, 75,000 goalkeepers are there in the world including 35,000 in Europe in 100 years.  If excess cancer risk is 2.6/1,000,000- with worst scenario, 0.20 person in the world and 0.09 person in Europe may get cancer in 100 years. Isn’t it negligible?  Even with current limit, 4.43 people in the world and 2.07 person in Europe in 100 years may get cancer. It is also negligible isn’t it?  Also, scenario should take consideration that the players in prestigious level have more opportunities to play on natural turf pitches without risk.  Setting too severe limit without clear logic is not productive. |
| **SEAC Rapporteurs response:** |
| 419 | **Date/Time:** 2019/08/19 16:41  **Type:** Individual  **Country:**  United Kingdom | **Comments on the SEAC draft opinion:**  I am very concerned that we are not doing enough to keep our children safe. They should be enjoying their childhood not risking their lives just to play sports.  Please have a look at this:  https://www.youtube.com/watch?v=Ena0l6X28HU&feature=youtu.be  "From our ongoing series of talks at Fully Charge LIVE 2019 at Silverstone. Helen Czerski chairs a lively conversation about particulates and tyre pollution and how governments and subsequent initiatives can help or hinder progress in our most populated of cities."  I thought that the recent question and answer talk at Silverstone regarding tyre particulates and pollution was one of the best talks on this. I am so glad that some people in the tyre industry are actually taking this seriously.  I have been working on raising public awareness of the health risks from exposure to 3G rubber crumb in artificial football pitches, and highlighting how our children are most at risk as the PAHs are very much higher than that allowed in toys. Children's immune systems are immature and this makes them much more susceptible to illness. I also don't think it's a good idea to have these pitches anywhere near schools and homes as the dust will blow around the area and affect children and people who aren't even playing on the pitch. I was really impressed with how much everyone on the panel cared. I consider that illnesses from exposure to rubber crumb in artificial pitches is a scandal on a par with asbestos, BSE and the contaminated blood scandals. Our government knows all about it but has decided to ignore it, and last year they actually decided that it wasn't in the public interest to disclose the cancer risks! Shocking.  Please also have a look at this:  https://zembla.bnnvara.nl/nieuws/dangerous-play  "Worldwide every day millions of children and adults sport on this type of artificial turf. In the Netherlands there are nearly 2000 of those fields. The crumb ensures that the field has the same properties as natural grass with the added advantage that it is practically always playable. But the rubber crumb contains zinc, lead and benzene and different polycyclic aromatic hydrocarbons (PAHs), substances proven to be carcinogenic. Nevertheless, the National Institute for Health and the Environment (RIVM) claims in 2006 that no health risks are expected from sporting on the artificial turf."  I think that if we continue to use rubber crumb infill in artificial football and sports pitches then children should be safeguarded with age restriction laws, the same as for smoking tobacco and drinking alcohol.  Our children are the future of our world. We have to do all we can to make sure that they grow up without unnecessary illnesses. Far too many have died and, consequently, their families have been destroyed. All of which could so easily have been avoided.  Please do something positive, thank you. |
| **SEAC Rapporteurs response:** |
| 420 | **Date/Time:** 2019/08/19 18:12  **Type:** BehalfOfAnOrganisation  **Org. type:**  Industry or trade association  **Org. name:**  European Recycling Industries' Confederation (EuRIC)  **Org. country:**  Belgium | **Comments on the SEAC draft opinion:**  The European Recycling Industries’ Confederation – EuRIC AISBL – is an umbrella organization for the recycling industries in Europe.  EuRIC welcomes the release of the Committee for Socio-economic Analysis (SEAC) opinion on Polycyclic-aromatic hydrocarbons – PAH - restriction in granules and mulches as infill material, and wishes to express the following comments.  1. Benefits of tyre recycling  The recycling of end-of-life tyres brings substantial environmental and socio-economic benefits. As outlined by a report done by GHK and Bio-Intelligence Service for DG Environment of the European Commission, a single kilo of tyre recycling into rubber granulates used in synthetic turf fields or other end-use applications avoids the emission of -2,7 kilos eq. of CO2, which represents net CO2 savings of 270% (1). More specifically, compared to a cement kiln co-incineration route, the most realistic route for waste tyres in an event of a ban, recycling a kilo of tyres would save 1,1 kilos eq. of CO2 (2).  More recently, a study based on life-cycle assessment (LCA) that the global warming potential, measured in terms of ton CO2 equivalents per football field, is the lowest for artificial turf infill materials produced from recycled tyres (Styrene Butadene Rubber - SBR) when compared to the other infill materials (3). To give an order of magnitude, infill materials from SBR saves up to 30 times more CO2 per football field than infill materials produced from thermoplastic elastomers (TPE) for a similar life span.    2. Support to the opinion of SEAC  EuRIC supports the SEAC opinion regarding the proposed restrictions applicable to PAH.  Regarding the risk management options, EuRIC agrees that the risk management option 1 is the most appropriate since it effectively takes into account the technical feasibility and the socio-economic aspects of the proposed restriction.  Regarding the concentration limit value upon which the proposed restriction on PAH is based, there is no significant difference between 17ppm and the 20ppm value proposed by the Committee for Risk Assessment (RAC) from a risk management point of view (4).  Therefore, EuRIC supports choosing a 20-ppm limit value, following the “practical-based limit” advised by RAC in its opinion. It is of paramount importance, since variations can occur in the results of PAH concentration analysis (up to 30%), due to the absence of harmonised test methods to measure PAH concentrations in artificial turf pitches, as underlined by stakeholders during the consultation. Having a slightly higher threshold, i.e. 20-ppm, would hence provide a necessary safety margin to tackle the lack of harmonised analytical method and lower the risk of unjustifiably rejecting rubber granules in the recycling process.  3. Practicality, incl. enforceability  EuRIC also agrees with SEAC that several factors might hamper the effectiveness of the restriction. EuRIC wishes to stress in particular the following critical points that were underlined in the report:  - The lack of a sound harmonized sampling and testing methodology. This issue is critical, as no standardized method to determine PAH content exists. The final restriction proposal needs to include a call to harmonize sampling and testing methodology for PAH in rubber infill, especially since granulated rubber is an inhomogeneous material, and therefore risk of collecting a non-representative sample is high.  - The lack of a harmonized end-of-waste criteria for End-of-Life Tyres granules which not only undermines legal certainty of product waste interface and hence of the enforcement of the proposed restriction which is applicable only when ELT-derived granules have legally ceased to be waste, on top of being a major obstacles to the completion of the circular economy in the field of tyre recycling.  Footnotes:  (1) GHK (2006), A study to examine the benefits of the End of Life Vehicles Directive and the costs and benefits of a revision of the 2015 targets for recycling, re-use and recovery under the ELV Directive - Final Report to DG Environment  (2) Niederberger A-A., Shiroff S., Raahuage L. (2013), Implications of Carbon markets for Implementing Circular Economy models, European Journal of Business Management, ISSN 2222-1905, Vol. 5.; No 3.  (3) Johansson K. (2018), Life cycle assessment of two end-of-life tyre applications: artificial turfs and asphalt rubber - Ragn-Sells Däckåtervinning AB  (4) The theoretical level of risk for human health in lifelong worse case exposure would remain very close in a 17-ppm and a 20-ppm threshold scenario (see RAC opinion).  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  This document has been prepared by EuRIC with the expert contribution of:  - ESTATO Umweltservice GmbH  - Genan Holding A/S  - Granuband BV  - Kargro Recycling bv  - Murfitt Industries Ltd.  - Ragn-Sells Tyre Recycling AB  Through its Member Recycling Federations and Companies from 20 EU and EFTA countries, EuRIC represents today over:  - 6,000+ companies generating an aggregated annual turnover of about 95 billion €, including large companies and SMEs, involved in the recycling and trade of various resource streams;  - 300,000 local jobs which cannot be outsourced to third EU countries;  - Million tons of waste recycled per year (paper, metals, plastics, tyres, glass and beyond).  Recyclers play a key role in a circular economy. By turning wastes into resources, recycling is the link which reintroduces recycled materials into the value chains again and again. |
| **SEAC Rapporteurs response:** |