**Response to comments on the SEAC draft opinion**

**on the Annex XV dossier proposing**

**restriction on**

**LEAD STABILISERS IN PVC**

**EC number:** - **CAS number:** -

**15 March 2018**

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| **Substance:** Lead compounds-PVC  **EC number:** -  **CAS number: -** | Comments and response to comments on SEAC draft opinion on Annex XV restriction report  submitted by **ECHA** on **16/12/2016**  Public consultation on SEAC draft opinion started on **20/12/2017** |

Comments on the SEAC draft opinion and specific information requests

## Specific information requests

1. A derogation is proposed for several article types containing soft (flexible) PVC recyclate for a period of 15 years from entry into force of the proposed restriction. However, as some of these article types have a higher potential for leaching lead into the environment during their service life than rigid PVC, the derogation for certain articles is conditional on the recycled PVC being entirely enclosed, i.e. encapsulated by a layer of virgin PVC. The applications requiring encapsulation of soft PVC recyclate are: roofing, waterproofing, traffic management and professional footwear.

SEAC is seeking information on the technical and economic feasibility of this derogation:

* 1. Is it technically feasible to encapsulate the recyclate contained in the above articles with virgin PVC? If so, what are the techniques that could be used?
  2. What would be the additional cost to industry to produce these encapsulated articles? What would these costs be composed of? Please quantify your reply.
  3. If it is not technically and economically feasible to produce encapsulated soft PVC articles, what would happen to the soft PVC waste that is currently recycled? Could it be e.g. diverted to produce the non-encapsulated articles foreseen in the derogation (e.g. mats for stables and greenhouses, noise insulation panels or three-layer hoses), or would it be disposed of or exported?
  4. Applications of soft PVC recyclate in mats for soil stabilisation and in mats used in industrial settings were not included, as it was not clear if these uses have a high potential for leaching during their service life, if not encapsulated (see above). If relevant, please answer questions a) to c) also for these applications.

1. A derogation is proposed for the use of lead compounds as pigments. The following two substances are currently used as pigments in PVC:

* Lead sulfochromate yellow
* Lead chromate molybdate red
  1. Are there other lead-containing substances used as pigments in PVC articles, in particular in imported articles? If so, do you have information about their composition?
  2. What are the costs for analytical testing needed to identify the presence of lead pigments in PVC articles?

1. For virgin PVC, a lower limit of 0.01% (instead of 0.1%) was suggested in the Public Consultation on the Annex XV restriction report.
   1. Would a limit of 0.01% be more difficult to achieve than 0.1% from a technical point of view?
   2. Would a limit of 0.01% be more difficult to enforce?

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| **Ref.** | **Date/Name/Org.** | **Comments** |
| 321 | **Date/Time:** 2017/12/21 11:30  **Type:** BehalfOfAnOrganisation  **Org. type:**  Company  **Org. name:**  <redacted>  **Org. country:**  Japan  **Company name confidential: Yes**  **Attachment:**  <redacted>  **Privacy comment:**  Protection of our commercial interests | **Comments on the SEAC draft opinion:**  We have not attached non-confidential comments |
| **SEAC Rapporteurs response:**  Thank you for the information. |
| 322 | **Date/Time:** 2018/01/26 13:40  **Type:** BehalfOfAnOrganisation  **Org. type:**  Company  **Org. name:**  REHAU AG + Co.  **Org. country:**  Germany | **Comments on the SEAC draft opinion:**  The period of 15 years for the derogation is too short. Windows have a working life of 40 years and more. The majority of PVC window profles produced before 2010 contain lead stabilisers. So lead stabilised recycling PVC will come back at least until 2050.  We suggest to expand the period of derogation to 30 years or to rediscuss the prolongation of the derogation after 15 years, with the same allowed percentage or with a percentage adapted to measured values. An end for the derogation after 15 years is too abrupt. |
| **Specific information 3:**  A limit of 0.01% would not be consistent with other EU regulations like ROHS.  For the production of window profiles there exist 2 different loops of recycled materials. An internal loop of regrind (lead free) and an external loop of post consumer PVC (containing lead). Both materials are processed separately, but on the same machines at a different time. Contamination of the lead free regrind with a lead containing regrind cannot be excluded completely. In such a case a limit of 0.1% would be no problem. But a limit of 0.01% can cause an exceedance. Even if only a small percentage of the regrind is added to the virgin material. |
| **SEAC Rapporteurs response:**  Thank you for the information.  The Dossier Submitter expects that after 2035 the lead content of PVC waste would have decreased and allow articles made with recycled PVC to comply with a concentration limit of 0.1 % (w/w) of lead. In order to account for trends in PVC recycling and lead content in PVC waste, the Dossier Submitter recommends to reassess the need to change the derogation after 10 years from entry into force. We agree that it is possible that the lead content of recycled PVC will be still be too high to comply with 0.1 % (w/w) after 15 years from the entry into force. Therefore, we support a review of this issue as proposed by the Dossier Submitter. |
| 325 | **Date/Time:** 2018/02/07 12:30  **Type:** BehalfOfAnOrganisation  **Org. type:**  Company  **Org. name:**  <redacted>  **Org. country:**  Netherlands  **Company name confidential: Yes**  **Attachment:**  <redacted>    **Privacy comment:**  We respectfully request that ECHA does not publish the information provided for this public consultation on “Comments for the Annex XV restriction report” for Lead compounds-PVC  Our reasons are as follows:  1. Protection of commercial interests of natural and legal persons (Art 4.2 of Regulation 1049/2001):  a. Publication of this information would potentially give our competitors information on the formulation of our customer’s products and <redacted>’s market share in this area. This information is business secret;  2. Protection of privacy and integrity of the individual (Art 4(1)b of Regulation 1049/2001):  a. Publication of the information could lead to violent action against our company and its officers;  b. Publication of this information will be used to pressure us by legal or public means which will negatively impact <redacted> and our products. | **Comments on the SEAC draft opinion:**  - |
| **SEAC Rapporteurs response:**  Thank you for the information. |
| 331 | **Date/Time:** 2018/02/19 14:07  **Type:** MemberState  **MS name:**  Sweden  **Country:**  Sweden | **Comments on the SEAC draft opinion:**  Combined composition of additives in PVC  The issue of recycling PVC is complex. In addition to a legacy content of lead stabilisers, which are specifically addressed in this restriction proposal, we can expect the occurrence of other additives as well. The composition depends on the required set of properties for every PVC quality. We believe that the assessment performed by the DS and the SEAC does not address this problem appropriately. At the end, this could lead to a wrong conclusion about the most appropriate risk reduction option for the society.  The Swedish Environmental Protection Agency recently published a study on emissions from articles (SEPA, 2018). In the study, modelling of emissions from articles was performed (the ChEmiTecs Emission model). In this study, they developed an “average chemical composition list” for plastics based on information from industry, from product declaration protocols, as well as from some other sources referred to in the report. This generated a final estimate of the volume of chemical additives in plastic articles in Sweden. The majority of these additives were estimated to be stored in pipes and hoses, plastic films and boards, in insulated wires and cables and in furniture. Taking into account that not all plastic articles contain all types of additives correction factors were used in the final list. (see page 22-23, table 0.1 and table 0.2 in the report).  The table shows that for every unit of stabilisers in a plastic article one could expect e.g. more than one unit of brominated flame-retardants and more than one unit of phthalates. Those substances may cause risks that should not be ignored in the assessment of risk management options for recycling of PVC and that may need a reconsideration of the provisions in.  If the conclusion after a reassessment still is to keep parts of points 4(a) and 4(b), we suggest SEAC to consider a review clause fort shorter periods than 15 years, starting e.g. 5 years from the first entry into force of the restriction.  Reference:  SEPA, 2018; Emissions from Articles - Synthesis report of the ChEmiTecs Research Program. ISBN 978-91-620-6802-8. Available at http://www.naturvardsverket.se/Om-Naturvardsverket/Publikationer/ISBN/6800/978-91-620-6802-8/?action=additem&lang=sv  Labelling of articles containing recycled PVC  The labelling of recycled material is crucial for enforcement according to SEAC since the 2% lead content limit covers nearly all intentionally uses, and particularly all high volume uses. The labelling needs to be secure and made in a transparent way. We believe that the suggested labelling “Contains recycled PVC” might be misleading for consumer with lead minimizing preferences. For less informed consumers, this may give the impression that the label is aimed to inform about environmental performance. It would be better and clearer to say, “Contains recycled PVC with up to 2% lead”.  The choice of 2% as the limit value for recycled content versus imported articles  Regarding imports and recycled material with up to 2% lead it is not perfectly clear if imported, recycled PVC material is also derogated with up to 2% lead, or if the derogation only applies to material recycled within the EU and all imports abide to the 0,1% limit? If imported recycled PVC material also are derogated so that a 2% lead limit applies, then it is hard to argue that the 0,1% limit will be achieved for all articles by 2035 to 2040. New recycled material with a 2% limit may then continuous be imported to the EU, hindering the low 0,1% limit to be achieved for all PVC. This would also mean that the aim of the restriction will not be fulfilled if this risk management option is chosen.  Other legislation  In point 4(e) we believe that articles covered by directive 2000/53/EC on end-of life vehicles should be added to the list. |
| **Specific information 1:**  Encapsulation of recycled PVC with virgin PVC:  Multi-layer pipes are not technically feasible for the purpose of transportation of sewage water.  According to experts from two organisations in the water and wastewater sector in Sweden, encapsulation of lead PVC with virgin PVC is not a secure enough method for use in sewage pipes and similar infrastructure with a life length of up to 100 years. The cost difference between pipes containing recycled or 100% virgin material is not an issue, compared to other more important costs in infrastructure projects. Once in the ground it is extremely hard to monitor degradation of the outer virgin PVC layer over time. It is quite common that tree roots can cut pipes and damage occur in a number of ways. Sewage pipes must be able to withstand mechanical treatment from inside, where a middle layer of recycled PVC can be uncovered. Encapsulation of recyclate with virgin PVC is thus not a technical secure enough method to use.  References:  Cajsa Wahlberg, Stockholm Vatten och Avfall; personal communication April 2014  Anders Finnson; The Swedish Water & Wastewater Association; personal communication April 2014  Even though our main conclusion is that all exemptions in points 4(a) and 4(b) should be reconsidered due to the combined composition of additives, we would particularly suggest SEAC to remove the following part of the proposal “ multi-layer pipes if the recycled PVC is used in the middle layer and is entirely covered with a layer of virgin PVC (excluding pipes for drinking water)”” |
| **Specific information 2:**  Our information, which is a few years old, is an approximate cost above 400 Euros per substance (4 000 SEK); i.e. above 800 Euros for both pigments. If you are interested, please contact us. Our inspectors can ask the laboratories for more updated prices.  Regarding the derogation for lead chromate pigments in PVC it is unclear why this derogation is needed, also taken into account that the information in the public consultation regarding those pigments were claimed confidential. If the intention with the restriction is to address stabilisers in PVC, there is no need to include a derogation for substances with other functions. A derogation in this restriction will give rise to more questions than clarifications of the use of lead pigments and clearly put a focus on the use of those substances in imported articles. For example if there are reasons to develop a restriction proposal on the pigments as well, as the risk of high lead levels in PVC should be the same regardless of whether the use is for stabilizer or as pigment and that the European paint industry has confirmed that alternatives to lead chromate pigments are available and used. |
| **Specific information 3:**  The inspectors at our enforcement department confirm that there are no difficulties related to a limit of 0,01 % lead (100 ppm). At that concentration level, both XRF instruments and chemical methods can be used without problems. Consequently, there will be no difference in the testing cost due to a lower concentration limit.  The divergent concentration limits proposed for recycled PVC compared to virgin material is more problematic from an enforcement perspective. There are no methods available to verify if the written information is correct. In addition, the following provision in points 4(a) and 4(b) is not possible to enforce: “All virgin PVC used in combination with recyclate in the above applications shall comply with paragraph 2.” |
| **SEAC Rapporteurs response:**  Thank you for information on emissions from articles published by the Swedish Environmental Protection Agency. We are aware that various chemical additives are contained in PVC articles. However, SEAC exclusively evaluates the restriction proposal submitted and hence does not perform a broader assessment on additives in PVC.  We agree that a reassessment of the derogation of recycled PVC is necessary in order to confirm its justification and effectiveness. A premature reassessment will not be meaningful taking into account the projections of the lead content in recycled PVC. Therefore, we think that a review after 5 years is too early and that after 10 years the results would be more appropriate as a basis to reassess the justification of the derogation.  The purpose of the label ‘contains recycled PVC’ is to enable enforcement authorities to identify relevant articles and not to inform consumers on the environmental performance of the articles. For enforcement, it is not needed to state the actual lead content on the label, which may also result in higher costs of labelling. Furthermore, the term ‘Contains recovered PVC’ proposed to articles containing recycled PVC was included in point 23 (Cadmium) of Annex XVII to REACH Regulation. For consistency in the provisions of the Regulation, a similar label is proposed in this restriction.  We would like to confirm that the derogation of recycled PVC equally applies to articles produced in the EU and to imported articles.  With regard to directive 2000/53/EC on end-of life vehicles, we understand that the restriction concerns the use of lead-based stabilisers in PVC, which is per se not relevant for the end-of-life of vehicles. Therefore, the directive you refer to is not included in the restriction.  **Specific information 1:**  Thank you for the information. We agree that the encapsulation of pipes with a long service life such as sewage pipes needs to resist abrasion over long time spans. RAC has highlighted the need to develop appropriate standards for encapsulation (e.g. in terms of layer thickness) to ensure that the layer of virgin PVC is functioning as an effective barrier. In our view sewage pipes would be a key application for which such a standard would be useful.  **Specific information 2:**  In principal we agree that lead pigments also contribute to the risk of lead emissions from PVC. However, the restriction covers only lead compounds used as stabilisers and only the impacts of restricting lead-based stabilisers were assessed in the Background Document. This was confirmed by the Dossier Submitter. To reflect this intention in the entry text, the Dossier Submitter added the derogation for the use of lead sulfochromate yellow and lead chromate molybdate sulfate red in PVC, which are the only lead pigments known to be used in PVC.  **Specific information 3:**  Thank you for the information.  We agree that it will be a problem to differentiate between virgin and recycled PVC if both materials are blended in the production of an article. If co-extrusion technique is used, the two materials are used separately in an outer layer (virgin PVC) and an inner core (recycled PVC), which could be measured individually. This could have implications for the costs of the analysis. |
| 341 | **Date/Time:** 2018/02/20 16:46  **Type:** BehalfOfAnOrganisation  **Org. type:**  International NGO  **Org. name:**  European Environmental Bureau  **Org. country:**  Belgium  **Attachment:** | **Comments on the SEAC draft opinion:**  The EEB continues to support the proposed restriction on lead used as a stabilizer in PVC.  We strongly support the proposed labeling provisions, which will allow manufacturers and consumers to make informed decisions.  In a few cases, derogations have been narrowed appropriately (if slightly) to reduce likely exposures; for example, PVC in flooring material. Overall, however, we are disappointed by the continued expansion of derogations and the increase in allowable limits.  We provide detailes comments in the attachment submitted. |
| **Specific information 2:**  SEAC has added a derogation for two lead-based pigments, lead sulfochromate yellow and lead chromate molybdate sulfate red, based on an entirely confidential comment for which no other information was provided. These compounds are non-threshold carcinogenic and reprotoxic substances. One applicant (DCC Maastricht B.V. OR) has been granted authorisation for limited use of these compounds, primarily as high-visibility markings on roads or metal surfaces. Due to the confidential nature of the comment, we are not aware of specific uses with relevance to recycling of PVC.  This derogation amounts to an authorisation to recycle PVC materials with these lead pigments. This is not a use granted by the authorisation or evaluated for risk by RAC.  The derogation is likely to complicate implementation of the PVC recyclate standards, since the simplest method of analysis (X-ray fluroescence, or XRF, identification of total lead in the recyclate) would not distinguish between lead-based pigments Proper analysis in the case of PVC bear lead-based pigments would require other, probably more difficult, test methods. We have no information on whether SEAC has considered the impact of this derogation on the implementation of the present restriction.  The lack of transparency behind this derogation is greatly regretted. |
| **SEAC Rapporteurs response:**  Recycled rigid PVC  RAC confirmed that a concentration limit of 2 % would not lead to significant additional risk from the articles covered by the derogation. At the same time, a ‘safety margin’ in the concentration limit would facilitate the smooth operations of the processing of post-consumer PVC waste and decrease the efforts spent by recycling companies (often SMEs) on the testing of lead content.  Flexible PVC  The requirement to encapsulate certain articles has been clarified in the text. This includes articles with a potential for direct consumer exposure.  Clean recycling loops  We would like to refer to the Dossier Submitter’s response as well as to the comments made by RAC and SEAC rapporteurs to your comment on this issue during the Public Consultation of the Annex XV report.  Circular economy  We cannot follow your criticism suggesting that SEAC took a simplistic view on recycling in its opinion on the proposal on lead in PVC. When evaluating the proposal we considered all available evidence and assessed the different socio-economic impacts. As you do not provide any examples from the opinion text to substantiate your criticism, we cannot see the basis for your view.  **Specific information 2:**  We would like to underline that the exclusion of the two lead pigments from the scope of the restriction was not a derogation SEAC proposed based on socio-economic considerations. In principal we agree that lead pigments also contribute to the risk of lead emissions from PVC. However, it was the Dossier Submitter’s intention to only restrict lead compounds used as stabilisers and only the impacts of restricting lead-based stabilisers were assessed in the Background Document. To reflect this intention in the entry text, the Dossier Submitter added the derogation for the use of lead sulfochromate yellow and lead chromate molybdate sulfate red in PVC, which are the only lead pigments known to be used in PVC. In our view this is transparently stated in the opinion. We also acknowledge that the derogation of lead pigments may require additional supply chain communication and more advanced testing during enforcement. |
| 345 | **Date/Time:** 2018/02/20 18:36  **Type:** BehalfOfAnOrganisation  **Org. type:**  Industry or trade association  **Org. name:**  AGPU Arbeitsgemeinschaft PVC und Umwelt e.V.  **Org. country:**  Germany  **Attachment:**  <redacted>  **Privacy comment:**  This part of the PVC volume straeams survey which we publish regularily has been produced on specific request of the german EPA (UBA) and was not disclosed to other 3rd parties. It indicates that window and cable recycling are the 2 main mechanical recycling applications in germany with the maned companies who are involved. | **Comments on the SEAC draft opinion:**  AGPU appreciates and supports the combined RAC and SEAC conclusions of the proposed lead restriction with the derogations for recyclates in selected applications. We also support that this restriction with its derogations will be reviewed after a longer period – whether this review takes already place after 10 years could be questioned, based on the specific product/waste/recycling streams which concern mainly products with very long service life.  It is essential to keep the 2% lead concentration level to ensure full utilisation of the well established mechanical recycling processes for the selected rigid PVC applications which reduce virgin material production with the associated product/energy consumptions and emissions.  In the area of flexible PVC recycling products, we are concerned about the requirement that road furniture and traffic management products have to be covered by virgin PVC. Especially these traffic management products are mainly heavy articles with little specific surface such as heavy base plates/blocks for mobile fences (e.g. plates/blocks of about 26 kg; 70 cm x 25 cm x 16 cm) and mobile beacons (e.g. blocks/plates of 28 kg; 87 cm x 42 cm x 11 cm). These articles are produced from cable scrap by a robust press molding process. We are not aware that this process can be modified to allow the application of an additional external layer of virgin PVC.  Therefore, we recommend that such PVC-products from flexible PVC recyclates which are used by professionals in industry applications should be derogated without an additional cover of virgin PVC. |
| **Specific information 1:**  please see the general comments. The recycling volumes used for traffic management and road furniture are much higher compared to the stable and greenhouse mats volumes. Also the quality of the cable srap is different to the raw materials used for stable mats therefore I doubt that such volumes move to the mats or multy layer hoses without additional treatment. |
| **Specific information 3:**  PVC converters who use both, lead containing recyclate and virgin PVC-dryblends on the same equipment contamination with the lead containing recyclate could occur. To which level could go is not clear but as lead compounds are no loger used for the stabilisation of virgin PVC in the EU plus NOR and CH. The level of 0.1% of lead is far too low to achieve the required stabilisation effect, therefore we do not see the need to go below that level for enforcement. |
| **SEAC Rapporteurs response:**  Thank you for the information. Articles made of flexible PVC like road furniture and traffic management have a relatively high leaching rate of lead from the PVC, encapsulation would limit this risk of leaching. We received information (see comment 346) indicating that there are possibilities to encapsulate flexible recycled PVC with virgin PVC. We acknowledge that it is likely that further R&D and investment would be needed to put available technical solutions into practice.  **Specific information 1:**  Thank you for the information.  **Specific information 3:**  Thank you for the information. |
| 346 | **Date/Time:** 2018/02/20 21:09  **Type:** BehalfOfAnOrganisation  **Org. type:**  Industry or trade association  **Org. name:**  EuPC, PRE, VinylPlus  **Org. country:**  Belgium  **Attachment: [[1]](#footnote-1)**    <redacted>  **Privacy comment:**  The R&D report referred in the statement contains many elements related to processing parameters, which constitute the know-how of the company. If required, the report may be consulted by webex by Echa, RAC and SEAC members.The name of the company is confidential and should be referred to as "PVC converter". | **Comments on the SEAC draft opinion:**  1) Impacts and benefits of recycling  We accept that the leaching of articles containing Pb should be taken into account over the whole life time of the article. Although the leaching of Pb from waterproofing is in this case of the same order to magnitude as the lowest releases rates of Pb resulting from the incineration of the same material, the release from this application over 20 years is only 1.37 T compared to 27800 tonnes emitted each year from other sources. Including traffic management and professional footwear is not relevant, because leaching from traffic management is at least 20 times lower than from waterproofing films. Emission from boots for professionals are expected to be even lower, because abrasion is only from the sole but not from the whole article (see Annex 1 : Comparison emission factors incineration and selected PVC recycled applications applications).  Additionally, it is important to keep in mind that the Pb content in soft PVC articles tends to decrease over time, reflecting the progressive substitution of lead stabilisers in new articles over the past years. The leaching calculations are based on a Pb content of 0,5% in soft PVC recyclate, whilst the last measurements from 2016 and 2017 show an average of 0,3 to 0,35%, 0,52% being the maximum observed.  As developed further under the answer to specific questions, the requirement that roofing and waterproofing, road furniture, traffic management systems and professional footwear provided the recycled PVC is entirely enclosed with a layer of virgin PVC equates, if applied in the foreseen transition period of only 2 years after adoption, to a ban of those applications.  Tonnage impacted by proposed restriction of SEAC :  The tonnage of applications that would be restricted is 127 kT.  Cost efficiency of the restriction :  The cost per kg lead emission avoided for PVC applications is several orders of magnitude higher than for the previous restrictions. On a pure weight basis, it is therefore significantly less cost-efficient to avoid lead emission by restricting PVC recycling than for the previous restricted applications. . Please refer to the revised cost-efficiency analysis included in RDC cost-benefit analysis (Annex 2) attached in Section IV  Cost benefit analysis  When applying the cost-benefit previously run to the restriction scope as proposed by SEAC, the following can be concluded. In summary, Recycling PVC waste is better for society than incineration or landfilling. For the analyzed recycled PVC applications (Traffic management, waterproofing (including roofing), mats for stables, greenhouses, 3-layer hoses, noise insulations sheets, footwear and boots for professionals and rigid monolayer pipes), the societal benefit of recycling ranges between 241 million € per year (1 788 €/t) and 328 million € per year (2 437 €/t) depending on which disposal route is considered for this particular analysis. Please refer to the revised cost-benefit analysis (Annex2) attached in Section IV.  2) Considerations on a few specific applications  In view of the “positive list” approach of the derogation proposed by ECHA, we would like to mention other applications that would also fall in the category “others soft” reported in our estimates of the uses of recyclate in soft PVC applications: soft PVC profiles (used either as gaskets for rigid profiles (usually inside the profile) or as shock absorbers as well as industrial coils.  Regarding decks and terraces, we wish to stress that we do not see any reason to require a layer of virgin PVC. The exposure scenario and target group are not clear. If skin contact is considered, as decking are hard surfaces often with an anti-slip pattern, people are unlikely to sun bath without a towel and certainly only in dry weather, implying low migration. It can be seen from our numbers that the potential for exposure to rigid PVC is extremely low. The same remark applies to monolayer pipes, for which extensive migration calculations were included in the documents provided in September 2017.  3) Number of times PVC can be recycled  A question was raised after the RAC meeting, regarding how many times PVC can be recycled. We are uploading 2 scientific articles in the non-confidential section. They refer to the same test: the regrind has gone through 10 thermal cycles without noticeable effect on performance or need to add additives. More specifically the cycles were: 1) compounding 2) injection followed by regrind 3) re-compounding 4) injection followed by regrind 5) re-compounding 6) injection followed by regrind 7) re-compounding 8) injection flowed by regrind 9) re-compounding 10) injection. The re-compounding step may not always be necessary; re-grinded material may be directly extruded. The reported experiments show however that PVC can withstand 10 thermal cycles.  This means that for a pipe with a lifetime of 100 years the encapsulation of Pb material can be extended without emission during 800 years.  References:  - Leadbitter J, Bradley J. Closed loop recycling opportunities for PVC. Current Trends in PVC Technology Conference. Institute of Polymer Technology and Materials Engineering, Loughborough University; 3–4 November 1997.  - PVC and sustainability in Prog. Polym.sci 27 (2002) , p. 2197-2226 (see p. 2216).  Another R&D report confirming that, provided process conditions are adequately controlled, up to 10 extrusions of used PVC material may be performed without loss of performance of the end article. Further information is provided in the confidential information section. |
| **Specific information 1:**  a & b. For calendering (probably only 7-8 kt), multilayer products exist with virgin PVC, but, as far as we are aware, the technology is not today applied to applications including recyclate. To be able to apply this with product containing recyclate, converters would have to install the appropriate equipment (this means additional extruders, adaptations to calenders, maybe total redesign of a plant), and the quality of recyclate must also be sufficient to allow this type of processing. Moreover, one also has to take into account the increased cost of raw material, depending on the virgin layer thickness, taking into account that those films are usually around 2 mm thick. This would result in substitution most probably by imports for lower value films as this is a highly competitive market and reverting back to virgin PVC for higher value products as the extra investment cost makes it less interesting to source recyclate.  Most of the remaining products (traffic management, roofing tiles, boots for professionals) are made by compression or injection moulding; the technical feasibility to encapsulate the recyclate within layers of virgin PVC is unknown, and most probably prohibitively expensive. The technology is not readily available and hence would entail development costs. Such an encapsulation requirement would actually be equivalent to negate the 1 % derogation, as the manufacturers are highly unlikely to invest in developing suitable technologies and modifying their equipment accordingly. They would therefore stop using recycled material, which will severely impact their profitability and will result in the disappearance of a significant market for recyclers. We estimate that more than 1,000 jobs are at stake in the EU.  Please refer to the annex 5 for an initial technology screening and an evaluation of types of cost involved. Regarding this screening, please note that the suggestion of RAC to enclose recycled material in a virgin layer has only been made last December. Within the short 2 months’ timeframe it has not been possible to devise an appropriate R&D plan and to actually test technological alternatives. New technical developments, if possible at all, will take years to test and assess. What becomes clear from our preliminary assessment however is that the enclosing requirement, if any, should not specify encapsulation in a soft PVC virgin layer but rather specify the need for a cover layer; this would allow extending the range of alternative cover materials (from industrial (and hence lead-free) PVC waste to other polymers and coatings) and of technologies to be used.  c. The market for the suggested alternative applications of soft PVC is far too small to absorb the amount of recyclate used in traffic management and waterproofing. The most likely is that this soft waste PVC would be disposed of.  d. The same considerations as developed above apply to mats in industrial settings and soil stabilization. The main technology used is compression or injection molding. The technology is not readily available for multilayer products and the cost would be prohibitive. Within the timeframe for the public consultation we could not establish the absorption capacity of markets for exports, but those are niche products, and hence that potential market uptake outside of Europe cannot be expected to compensate the loss of EU market in the short timeframe foreseen for the restriction. |
| **Specific information 3:**  A lower limit would be more difficult to achieve for converters producing articles, either containing recyclate, or only virgin PVC, depending on recyclate availability, and using the same equipment in both cases. The cleaning would become lengthier, increasing the time during which the equipment is out of production. Furthermore, 0.1% Pb content in a virgin PVC article is a level already far below the level required for stabilisation: hence, lowering it to 0.01% would merely create more analytical complexity, without any practical higher protection. |
| **SEAC Rapporteurs response:**  Thank you for the information.  From the analysis you have provided on the encapsulation of certain articles, we understand that in principal it is possible to encapsulate articles made of flexible recycled PVC, but that further R&D and investment is needed to put it into practice.  **Specific information 1:**  Thank you for the information.  **Specific information 3:**  Thank you for the information. |

1. A slightly updated version of the attachment was received after the end of the public consultation. [↑](#footnote-ref-1)