

Impact of the restriction on plastics recycling

Plastics Europe (PE) is committed to the sustainability of the European Plastics industry. We are working towards increasing the recycling and recyclability of plastics to fulfil the targets set out in the EU Green Deal and associated regulations (e.g., ELV¹, PPWR²). In this context, we need to raise some concerns regarding the impact of the restriction on plastics recycling.

The proposed restriction creates general uncertainty that would undermine investment decisions and innovation in plastics recycling undermining the strategic European Green Deal ambitions.

1. Not all PFAS are the same.

- a) By way of derogation, fluoropolymers and applications containing a fluoropolymer shall not be restricted.**

A segmentation of the PFAS family according to known properties rather than a structure-based classification alone is needed for a risk-based regulatory approach and is a scientifically based approach. As is well documented, the PFAS group is extremely diverse.

PFAS, as defined by the restriction share a common fully fluorinated C-F moiety, but across the group substances have very different properties, behaviors, and very different risk profiles. Fluoropolymers, for example, are non-toxic, not bioavailable, non-water soluble and non-mobile molecules. They have properties predictive of low environmental and human health hazard and meet the OECD criteria for “polymers of low concern” (PLC)³. More specifically, within the context of plastics recycling it is important to note that fluoropolymers are not a source of short chain PFAS as a result of their manufacturing process and they do not degrade into short chain PFAS.⁴ That’s why these and other substances do not pose an “unacceptable risk” according to Article 68.1 of the REACH-Regulation⁵.

Fluoropolymers are critical in many industries, among others in clean energy, medical technology, defense and ICT, it is therefore worthwhile to further explore their physical and chemical recycling potential and value as secondary raw materials. For this, additional investment is needed. New technologies are required to recycle these materials and to make them an integral part of the circular economy.

Therefore, by way of derogation, fluoropolymers and applications containing a fluoropolymer shall not be restricted.

2. Unfeasibility to implement and to comply with the proposed restriction's provisions.

Akin to the situation that exists in the paper- and textile-recycling industry, PFAS will be detectable in mechanically recycled polymers in the near to long term future. Polymeric PFASs are frequently used as polymer processing aids. It is crucial to emphasize that fluoropolymers are not source of short chain PFAS, as was already mentioned. In the production of Polyethylene (PE) for instance

¹ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on circularity requirements for vehicle design and on management of end-of-life vehicles, amending Regulations (EU) 2018/858 and 2019/1020 and repealing Directives 2000/53/EC and 2005/64/EC

² Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on packaging and packaging waste, amending Regulation (EU) 2019/1020 and Directive (EU) 2019/904, and repealing Directive 94/62/EC

³ Additional information on the PLC criteria and its practical application: <https://setac.onlinelibrary.wiley.com/doi/10.1002/ieam.4646>

⁴ Charles River Labs, Den Bosch, Netherlands, biodegradation tests OECD (301B) and OECD (302C) as presented at Fluoros 2021

⁵ FPG public consultation to the REACH PFAS restriction 7 July 2023. Reference 62deedd5-a37c-4cbd-b078-c00f60b11390

PFAS eliminate melt fracture, improve the surface finish, and reduce die build up during the converting step from PE pellets into finished articles such as packaging film, blow molded bottles and pipes the latter having a lifetime of 50 to 100 years.

Another example is the separate collection of WEEE (waste from electrical and electronic equipment) which is an important resource for the circular economy. WEEE is considered as one of the fastest growing waste streams in the EU⁶. It includes different polymers, mainly ABS (Acrylonitrile Butadiene Styrene), PP (Polypropylene) and PS⁷. As PFAS have been and are being used in the electronic parts in the industry, it can be assumed that due to their longevity not only will they be found in plastics from WEEE but that, due to the long service life of some of these products, they will be present in WEEE waste for many years to come.

However, as stated by the submitters of the Annex XV dossier, the main PFAS emissions to the environment from electronic equipment occur during their waste phase, while release during their use phase is very limited⁸. For large household equipment applications, the life span is up to 12 years⁹ and for cars it is up to 35 years¹⁰. Thus, through the prolonged use-phase of recycled and re-used materials, circularity and recycling goals can be achieved and emissions will be avoided.

Our limited data suggest that PFAS in recycled plastics sometimes exceed the proposed threshold levels. Thus, the content of total fluorine exceeded the proposed limit of 50 ppm in some samples from WEEE. Further analysis on single short-chain PFAS which were done by industry using third party labs have shown that depending on the method applied the same PFAS were either non-detectable or found in the range between 10 and 400 ppb.

Meeting the proposed total fluorine content threshold of 50 ppm is therefore a challenge especially due to cross contamination also during the waste collection through e.g. paper-based wastes and/or other sources of cross contamination. Demonstrating compliance will be associated with unavoidable legal uncertainty that will affect both compliant and non-compliant products alike. The other issue lies in the logistical consequences. Before waste plastic will be allowed to enter the recycle stream, it will need to be quarantined until analytical results confirm that it satisfies restriction requirements. This will necessitate additional batch control measures and storage facilities, the scale of which will be determined by the turnaround times for analytical certification.

As an example, for the volumes that would fall under such control measures one can consider the latest proposal for the revision of the ELV Directive targeting 25% of plastics that will have to come from recycled sources. Considering the share of plastics of 8% alone in the automotive sector in Europe adding up to 31 Mt of plastics per year this will lead to a demand for 8 Mt of recycled plastic per year with even greater demand in the future¹¹. On a larger scale the total volume for the plastic waste stream after collection and sorting in 2020 was 29,5 Mt. Considering the widespread use of PFAS and the proposed restriction, all post-consumer plastics will have to be analyzed for PFAS for up to 50 years or longer depending on the length of the use phase of the products in the recycling streams.

⁶ European Commission, 2023. Commission consults citizens and stakeholders on the Directive on waste from electrical and electronic equipment (WEEE). https://environment.ec.europa.eu/news/commission-consults-citizens-and-stakeholders-directive-waste-electrical-and-electronic-equipment-2023-06-16_en.

⁷ Cardamone, G. F., Ardolino, F., Arena, U., 2021. About the environmental sustainability of the European management of WEEE plastics. *Waste Management* 126, 119-132. <https://doi.org/10.1016/j.wasman.2021.02.040>.

⁸ European Chemicals Agency, 2023. Annex XV Restriction report. Proposal for a Restriction on the manufacture, placing on the market and use of PFASs, chapter 1.1.5.1. <https://echa.europa.eu/documents/10162/1c480180-ece9-1bdd-1eb8-0f3f8e7c0c49>.

⁹ Alejandre, C., Akizu-Gardoki, O., Lizundia, E., 2022. Optimum operational lifespan of household appliances considering manufacturing and use stage improvements via life cycle assessment. *Sustainable Production and Consumption* 32, 52-65. <https://doi.org/10.1016/j.spc.2022.04.007>.

¹⁰ Held, M., Rosat, N., Georges, G., Peng, H., Boulouchos, K., 2021. Lifespans of passenger cars in Europe: empirical modelling of fleet turnover dynamics 13:9. <https://doi.org/10.1186/s12544-020-00464-0>.

¹¹ Plastics Europe, 2022. Plastics the facts. https://plasticseurope.org/de/wp-content/uploads/sites/3/2022/10/PE-PLASTICS-THE-FACTS_20221017.pdf.

For these reasons, we think that establishing reliable quality and compliance control systems covering several thousand substances is not feasible and will make most plastics recycling within the EU both impractical and economically nonviable.

We therefore strongly recommend that all plastics from recycling be exempted from the restriction proposal and that PFAS contents from a yet to be specified list of PFAS will be monitored instead.

Specific information requests:

1 - Sectors and (sub-)uses: Please specify the sectors and (sub-)uses to which your comment applies according to the sectors and (sub-)uses identified in the Annex XV restriction report (Table 9). If your comment applies to several sectors and (sub-)uses, please make sure to specify all of them.

The sectors and sub-uses that apply were not mentioned in table 9. Use of recyclates in all applications, because in a mature circular economy for plastics, recycled content will be the standard commodity for most polymers, supported by an open loop recycling pathway.

4 - Impacts on the recycling industry: To get an understanding of the impacts of the proposed restriction on the recycling industry, information is requested on:

b- The measures that recyclers would need to take to achieve the proposed concentration limits.

The testing for residual PFAS will be very challenging for the recycling industry due to time and space needed for quarantining the waste, shortages of laboratories etc. The requirement for testing will therefore be prohibitive for the uptake of the recycling industry.

Due to the wide-spread use of PFAS today and in the past, the thresholds set out in RO2 cannot be met in mechanically recycled plastics at this point in time. The thresholds for short-chained PFAS under RO2 would preclude recycling as they would not be met.