PLASTICS RECYCLERS EUROPE
making plastics circular

Brussels, 22 September 2023

Third Feedback Universal PFAS Restriction

Since our first submission (#6198 found in Part 32 of the comments submitted to date on the restriction report) which focused on the difficulty of measuring small PFAS and demonstration of compliance and our second submission which focused on the larger PFAS and included results of TOF measurements of representative samples of recycle from various waste-polymer recycle streams, a member of PRE generated additional data on small PFAS in WEEE recycle samples that we would like to share. This data is mainly relevant in relation to the thoughts expressed in the first submission and confirms our assessment on what should be done with the limits proposed in relation to recycle and articles manufactured with recycle.

1 Sample selection

The member company collected 14 samples from various other WEEE plastics recyclers.

2 Analysis method

12 samples were provided to a well-known analytical laboratory and subjected to testing according to ISO 23702-1, a method whereby compounds are extracted with a suitable solvent separated by liquid chromatography and detected with a MSMS system. 44 individual small PFAS were included in the package offered by the analytical laboratory, which as discussed in our first submission is not covering all PFAS that are to be regulated under the proposed restriction.

In addition, EN 15408 was used to quantify total organic fluorine in all 14 samples.

3 Results

The results of this work are presented in Table 1.

The values for total organic fluorine (TOF) are roughly in line with the findings presented in the second PRE submission to the public consultation showing ppm level contamination. This analytical laboratory also had issues guaranteeing a certain limit of detection as is shown by the variability in the reported limit of detection.

The detected small PFAS in these samples were Perfluorobutanesulfonic acid (PFS C4; Cas 375-73-5), Perfluorodecanoic acid (PFC C10; Cas 335-76-2), 1H,1H,2H,2H-Perfluorohexanol (4:2 FTOH; Cas 2043-47-2), and 1H,1H,2H,2H-Perfluorododecanol (10:2 FTOH; Cas 865-86-1).

The limits of detection for these substances varied by substance and through time as for later samples the analytical laboratory adjusted their limits of detection upwards. This was due to a change in their extraction method which was introduced to increase sensitivity in other fields. It is observed that the limit of detection was lower for smaller PFAS (e.g. 2 ppb for PFS C4 vs 5 ppb for PFC C10). This is logical since smaller substances tend to be more readily extractable from polymeric matrixes and give sharper peaks in liquid chromatography. For some PFAS the limit of detection was below the 25 ppb being proposed, while for other the limit of detection was higher than the proposed 25 ppb for individual small PFAS. This is another more practical issue when attempting to demonstrate compliance. Furthermore, there is a difficulty for the sum

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limit since with such limits of detection it is not possible to prove compliance to the sum total limit. This issue is increased when more PFAS are included in the analysis.

*Table 1 TOF and selected small PFAS results in WEEE plastic recyclate. In these samples 44 small PFAS were quantified with varying limits of detection based on the capability of the laboratory, those detected in at least one sample are reported below. n.t. means not tested. * PFS C4 = Perfluorobutanesulfonic acid PFBS (Cas 375-73-5), PFC C10 = Perfluorodecanoic acid PFDA (Cas 335-76-2), 4:2 FTOH = 1H,1H,2H,2H-Perfluorohexanol (Cas 2043-47-2), 10:2 FTOH = 1H,1H,2H,2H-Perfluorododecanol (Cas 865-86-1)*

SampleID	TOF (ppm)	PFS C4* (ppb)	PFC C10* (ppb)	4:2 FTOH* (ppb)	10:2 FTOH* (ppb)	Sum of detected PFAS (ppb)
PREM001S001	10	n.t.	n.t.	n.t.	n.t.	
PREM001S002	<10	n.t.	n.t.	n.t.	n.t.	
PREM001S003	30	<2	<5	<40	<20	
PREM001S004	150	11	23	410	<20	444
PREM001S005	50	<2	17	<40	20	37
PREM001S006	<10	18	<5	190	<20	208
PREM001S007	<25	2	7	<40	<50	9
PREM001S008	<25	<2	10	<40	<20	10
PREM001S009	<25	20	7	<40	<20	27
PREM001S010	<25	36	<5	<40	<20	36
PREM001S011	20	63	16	<400	<100	79
PREM001S012	10	46	<15	<400	<100	46
PREM001S013	<10	11	<15	<400	<100	11
PREM001S014	10	<10	<15	<400	<100	

Two sample contained TOF at or over the proposed TOF limit.

Small PFAS were detected in 10 of the 12 samples tested and 5 of these contained a specific individual small PFAS above the proposed 25 ppb limit value. Just one of these samples exceeded the proposed 250 ppb sum-total limit value.

4 Discussion

The results show that recyclate from WEEE recycling will contain small PFAS and sometimes exceed the proposed limit value of 25 ppb. We are unaware of any useful reason for integration of these specific PFASs into plastics materials and suspect that such ppb level contamination may be present in any and all material that has existed for a number of years since PFAS are omnipresent environmental contaminants.

5 Recommendations

The recommendations with regards to the TOF limit in our second submission stand and are unaffected by this new evidence (in fact the new TOF data supports the recommendations).

However, in the first submission we argued for:

1. A general derogation from the 25 ppb and 250 ppb limits for small PFAS in recyclate and articles incorporating recyclate; or
2. A switch to an exhaustive list of small PFAS to be regulated with the 25 ppb and 250 ppb limits.

At the time primarily because it is impossible to demonstrate compliance to limit values that apply to an infinite number of substances. This remains our primary argumentation to either grant a derogation for the small PFAS limits in recyclate and articles incorporating recyclate **or** to generate an exhaustive list of PFAS to be regulated.

However, given the fact that it has now been demonstrated that recyclate can contain small PFAS above the proposed limit values, we would like to clarify that if an exhaustive list is created (e.g. by determining which PFAS are currently registered), we will have to perform testing to determine whether or not any of these PFAS on the exhaustive list are contained in recyclate and at what level. Therefore, we would like to amend these recommendations on the small PFAS limits (i. and ii.) to:

1. A general derogation from the 25 ppb and 250 ppb limits for small PFAS in recyclate and articles incorporating recyclate; or
2. A switch to an exhaustive list of small PFAS to be regulated with the limits to be determined based on the level of their unintentional presence in recyclate.

ABOUT PLASTICS RECYCLERS EUROPE

Plastics Recyclers Europe is an organization representing the voice of the European plastics recyclers who reprocess plastic waste into high quality material destined for production of new articles. Recyclers are important facilitators of the circularity of plastics and the transition towards the circular economy.

Plastics recycling in Europe is a rapidly growing sector representing over €8.7 billion in turnover, 11.3 million tonnes of installed recycling capacity, more than 730 recycling facilities, and over 30,000 employees.

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