



Brussels, 2024

## Joint industry statement on Persistent organic pollutants - UV-328

The undersigned Associations, representing the recycling and waste management industry at European level, support the general objective of the Stockholm Convention to eliminate Persistent Organic Pollutants and its EU Implementation under the POPs Regulation. With this paper, we would like to express our joint views regarding the EC draft delegated act amending the Annex I of the POPs Regulation to set the Unintentional Trace Contaminant (UTC) limit for UV-328 at 1 ppm (1 mg/kg; 0,0001% by weight).

### UV-328 and Benzotriazoles in recyclates

As UV-328 is a highly effective UV absorber<sup>1</sup>, this benzotriazole compound can be used in low concentrations, as a light stabilizer for various plastics and other substrates. As for plastics, this substance does not significantly change physical and/or mechanical property of the material, hence as of today there is no way to separate plastics containing UV-328 from plastics not containing UV-328. Furthermore, no technology exists that would be able to remove UV-328 from a polymer matrix in an environmentally friendly or cost-effective manner.

Within its membership, PRE carried out an initiative for screening substances of concern in recyclate, where samples of recyclate were collected, across different plastics streams and industries. For this screening, extruded plaques, made out of recycled flakes or pellets, were employed (please refer to [Annex I](#) of this document for further explanation). This initiative was launched by PRE also with the aim of establishing a 'sample bank' of samples that are representative of European Recyclate. For such measurement campaign, various types of analysis were performed, spanning from XRF, GCMS and LCMS SVHC screening, to specific LCMS/MS techniques for target substances. This resulted in a well characterized sample library of 100+ samples of material, representative of common varieties of plastics recyclate.

A selection from this sample bank was used for a broad screening of benzotriazoles. Samples were selected to ensure the different recycling subsectors are included, within an appropriate range of donating companies, and of different sources. Measurements were carried out by a renowned laboratory in Belgium that also does compliance testing for national authorities. A wide range of benzotriazole was included in the testing programme, such as UV-320, UV-327, UV-328, and others.

The results of the broad spectrum benzotriazole screening can be seen in Table 1. **None of the samples tested** showed any benzotriazole above the reporting limit of 0.01%.

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<sup>1</sup> A UV absorber is a molecule that absorbs UV radiation and converts this to molecular vibration (heat) and sometimes a photon with a higher wavelength/lower energy.

Table 1. Results of the PRE Measurement Campaign into a broad spectrum Benzotriazoles analysis of various recycle samples.

Sample ID	Recycling Industry Subsector	Source	UV 234	UV 320	UV 326	UV 327	UV 328	UV 329	UV 350	UV P	
L0001	Flexible PP & PE (28%)	Household Films	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
L0006		Shrink film neutral thin	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
L0012		Commercial Film	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
E0003	Rigid PP & PE (25%)	Drums and IBC containers	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
E0024		Wheelie bins	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
E0037		Small bins and crates	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
P0004		Sheet	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
P0008		ELV ASR	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
P0019		Maritime industry	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
P0020		Maritime industry	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
P0036		Household / Automotive / Commercial	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
T0003		PET (26%)	96% Bottles - 4% trays	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%
C0008		PVC (9%)	Pipes and Construction Profiles	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%
S00002	Technical Plastics (4%)	ELV Bumpers	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
S00010		Container Park Plastics	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	
S00021		Small Domestic Appliances	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	<0.01%	

The laboratory indicated that the testing method available and employed has a determination limit of maximum 0.005% and a reporting limit of 0.01%, thus making it unfeasible for them to match the proposed UTC limit of 0,0001%. It should be noted that the laboratory in question, while in the industry's view is excellent, it has implemented their own in-house method based on some specifications from the OEKO-TEX®<sup>2</sup> certification scheme. This is because there is no EN or ISO standard established for which [interlaboratory testing](#) has been conducted and independently verified. Based on experience with other substances incorporated in polymer matrixes, the industry strongly believes that such work could reveal quite large variations between different laboratories. This is one of the reasons for a higher "reporting limit" compared to the "determination limit"<sup>3</sup>.

<sup>2</sup> OEKO-TEX® is a certification scheme for the textile industry. It is not an official EN or ISO standard, typically meaning that between laboratory validation work has not been done.

<sup>3</sup> (For a more extensive deliberation on this subject, see for example, the [waste and recycling coalition paper on Dechlorane Plus](#)).

The joint Association's party to this statement consider it to be essential to have an interlaboratory comparison being done on analysis methods **before** a UTC limit is adopted. The European Commission's Joint Research Centre has successfully undertaken such work previously for the [polycyclic aromatic hydrocarbons](#), in the context of the review by the EC of the PAH restriction. However, we do understand and share the wish to prevent virgin use of POP substances.

### Joint industry proposal on UTC limit of UV-328

We would like to remind the European Commission that similar to Dechlorane Plus, no impact assessment is available that evaluates the setting of limit values below 0.1%. In this case, there was not even an ECHA Restriction Process to inform the discussion. The closest equivalent documentation in the Stockholm Convention would be the Risk Management Evaluation (UNEP/POPS/POPRC.18/11/Add.2<sup>4</sup>), which does not contain text on where an UTC level should be set.

In our previous feedback submitted to the 29<sup>th</sup> POP CA meeting,<sup>5</sup> the industry indicated 0.1% as preferred limit in mixtures and articles, including a review clause of 1 – 2 years, necessary for to generate data on the background levels in recyclate. Since writing that paper, it has been possible to generate such information.

Considering this and the results collected in the PRE substance screening exercise for benzotriazoles, we are reasonably confident that a limit of 0.01% would prevent intentional use and that recyclate would not contain UV-328 at a level exceeding this. Therefore:

***We strongly advocate that the UTC for UV-328 be set at a level of 0.01%.***

Finally, we would like to stress further that there is an urgent need for a European scientific and verifiable testing methodology agreed for all substances, that can be used on an industrial continuous basis, so that the industry can embrace the challenges ahead with certainty.

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<sup>4</sup> Available [the Stockholm Convention Website](#)

<sup>5</sup> See paper submitted to [CIRCABC](#) for the 29th POP CA meeting.

**For and on behalf of the following industry Associations:**



*FEAD is the European Waste Management Association, representing the private waste and resource management industry across Europe, including 19 national waste management federations and 3,000 waste management companies. Private waste management companies operate in 60% of municipal waste markets in Europe and in 75% of industrial and commercial waste. This means more than 320,000 local jobs, fuelling €5 billion of investments into the economy every year.*



*EERA is the voice of WEEE recycling in Europe being the professional association for the e-waste recycling and reprocessing industry. Our mission is to achieve a level playing field for fair competition in the WEEE value chain, harmonisation of regulations, effective and efficient recycling and reprocessing with prevention of pollution, minimization of emissions and a high quality of secondary raw materials and components.*



*EuRIC is an umbrella organisation for European Recycling Industries. Through its Members, EuRIC represents companies involved in the collection, processing, recycling, transport and trade of a variety of recyclables (metals, paper, plastics, glass and beyond) across Europe. By servicing its Members, EuRIC contributes to promote recycling, which is first and foremost a business activity driven by an ecosystem of thousands of Small and Medium-size Enterprises (SMEs) and fewer but equally important larger companies. All of them are local and global actors*



*Plastics Recyclers Europe (PRE) 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.*

## Annex I Explanation for the choice of Extruded Plaques

The primary reason for desiring extruded plaques as samples instead of samples of recyclate as such is that recyclate is often supplied to the market as regrind (also known as flakes<sup>6</sup>).

Regrind is a substance/mixture under REACH of cleaned size reduced pieces of the original waste articles. Each individual piece thus has the chemical composition of the article. To obtain the chemical composition of a big bag or batch of such material one would have to ensure that when analysed enough individual pieces are included. If sent in its raw state to an analytical laboratory several hundreds of grams of material would have to be subjected to solvent extraction or other extraction technique prior to injection in chromatographic equipment (e.g. GC or LC) coupled with a detector system (normally MS).

Analytical laboratories and analytical chemists in general tend to be familiar in handling a few grams or even micrograms of material. Equipment is normally not set up to treat such (in their eyes) humongous bulks of material. As such good, involved, and honest laboratories will simply refuse to analyse such samples (or suggest a way to homogenise the samples). Bad or simply poorly informed laboratories that do not realise the need to have such a mass analysed would take just one or two flakes and perform the analysis on this and report the results as being for the entire batch of material; without informing the client that only one or two flakes were analysed.

From a scientific perspective there are two ways to deal with this phenomenon. Firstly, one could take the 100+ gram regrind sample and grind this in its entirety, mix it well, and take a small subsample (e.g. 1 gram) for chemical analysis. Alternatively, one can pull the material through a (lab) extruder and thus mix the regrind in the melt phase. Scientifically these two methods are roughly equal. There may be some scepticism on whether mixing in the melt phase would really produce a homogenous material. However, given the uniform colour that is obtained when mixing material with all sorts of different colours, this seems to be the case<sup>7</sup>.

From a practical perspective, however, quite a few recyclers will have a laboratory extruder in their laboratory and the ability to produce plaques of material. Such plaques and extruded material are used to determine to a degree polymer composition (e.g. through differential scanning colometry) and physical mechanical properties (e.g. tear strength, impact resistance). Recyclers do not have the equipment to perform cryogenic grinding.

In chemical analytical laboratories this is the other way around. Quite a few laboratories will have cryogenic mills, while only very few specialised in plastics will have laboratory extruders. However, such cryogenic mills are normally more used to turn a solid material to a powder to increase the surface area prior to an extraction process. Grinding 100+ gram in these devices would still be a chore and quite unusual. The practical risk would remain that the analyst charged with the procedure would simply take one or two flakes, grind this and perform all subsequent steps of the analysis with material thus obtained; with the end result being data not representative of the big bag/batch. Laboratory extruders do not have this risk since they require being fed with 100+ grams to operate.

There are three added benefits from the extruded plaque approach.

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<sup>6</sup> The PET recycling sector tends to speak of flakes, while other sectors refer to material in a similar state as regrind.

<sup>7</sup> Colour in plastics is normally the result of the use of pigments, which are astronomically larger than molecules such as additives, which would move much more freely in the melt phase.

- Firstly, plaques can also be analysed with XRF a technique that is being adopted by some recyclers for quality control purposes. For example, the calcium content thus obtained is a proxy for calcium carbonate filler content. Lower content of this tends to mean better physical mechanical properties. The XRF guns can also give some regulatory pertinent tacit information. High bromine content tends to be indicative of brominated flame retardants (BFRs) in the big bag/batch, while a low content would mean that BFRs cannot be present above certain levels. (On a side note, unfortunately these XRF guns cannot detect fluorine. In fact, they struggle with chlorine, with order of magnitude greater limits of detection (several hundred ppm to 150,000 ppm) compared to bigger elements such as bromine for which detection limits are in the ppm range.)
- Secondly, the regrind in subsequent production steps will be molten at least once. Performing an analysis of the material that has gone through a similar thermal processing step would be more representative of what the final articles will become.
- Thirdly, a plaque is simply more convenient to store, ship, and otherwise handle than a fine powder.