

Dutch Paper and Board industry input on the public consultation on restriction dossier to the European Chemicals Agency (ECHA) on per- and polyfluoroalkyl substances (PFAS).

The topic of PFAS has received large public pressure and attention, which caused on 13th of January, the Competent Authorities of The Netherlands, Germany, Norway, Denmark, and Sweden ('Dossier Submitters') to submit a restriction dossier to the European Chemicals Agency (ECHA) on per- and polyfluoroalkyl substances (PFAS). ECHA then published a final restriction proposal for PFAS on the 22nd of March.

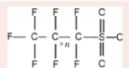
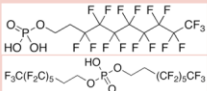
In response on the public consultation on restriction dossier to the European Chemicals Agency (ECHA) on per- and polyfluoroalkyl substances (PFAS) the Dutch Paper and Board industry would like to submit information on the transitional period and the proposed period of entering into force of the restriction proposal for paper and board.

General

Information on PFASs in paper and board is scattered and concentrations found vary hugely. Many PFAS types are not analysed on a regular basis (e.g. FTOH), and additionally there are many PFAS congeners that are not detectable with commercially available equipment (so called Dark Matter).

In table 1 below is a summary of data found in literature for paper, board, food contact materials, sludge and sediments downstream from paper mills. Again, we stress that this overview is far from complete or balanced.

Table 1: Overview of PFAS concentrations in Paper and Board streams

Group name	Typical chemical structure	Type of paper	Concentration range (µg/kg ds)	Remarks	Reference
Perfluoroalkyl carboxylic acids (PFCAs)		Paper recycling	0 - 10 (see remark PFPrA!)	Short and intermediate chainlengths. 1300 PFPrA (C3) was measured in Pancras 2021. However, this result is questioned. PFPrA is not analysed for on a regular basis.	Pancras 2021
Perfluoroalkyl sulfonic acid (PFASs)			36 (PFOS, sample from 1996) 0 – 70	Phased out, continuing emissions of precursors such as EtFOSAA	Munoz 2021 Pancras 2021
Fluorotelomer phosphate esters (mono/di/tri) (monoPAP, diPAP, triPAP)		Toiletpaper Fibres	3 diPAP in toilet paper 400 – 2000 diPAP, samples from 2008	High concentrations diPAP in sediments near papermill	Thompson 2023 D'eon 2009 Kärman 2022
Fluorotelomer alcohol (FTOH)		Food contact material	0 – 18 000 (sum) 0 – 100 000	- Table wear and popcorn bags uit China - FCM Canada, after hydrolysis (breaking bond with paper fibre) - FTOH is often not analyzed for in other reports	Yuan 2016 Schwartz-Narbonne 2021
Fluorotelomer sulfonic acid (FTS)		Paper recycling	0 - 14		Pancras 2021
Perfluorooctane sulfonamide (FOSA) en afgeleiden MeFOSA, EtFOSA, DiSAMFOSA, MeFOSAA, EtFOSAA		Papersludge	3,6 (EtFOSAA, paper pulp) 0 – 32 (EtFOSAA, paper sludge)	DiSAMFOSA in sediments near paper mill	Pancras 2021, Langberg 2020

Although the information on PFASs in paper and board is both scattered and not fully transparent on the concentrations of PFASs in paper and board. The restriction dossier to the European Chemicals Agency (ECHA) on per- and polyfluoroalkyl substances (PFAS) is clear on the intentionally added PFASs. The Paper and board industry supports the European restriction on the intentionally added PFASs.

The Dutch Paper and board industry has already start producing PFASs free packaging (non intentionally added Pfas) thus would benefit from RO1. However the extent to which the paper and board packaging with intentionally PFASs still exist in the European market depends on imports from outside the EU. This effect of import on the concentrations of PFASs in paper and board packaging is unknown. Furthermore Paper and board industry in Europe is characterised by an open trade between member states. For paper and board industry this is important so we are strongly in favour of a European approach to PFAS because national initiatives would result in many different legislations and interpretations, which would seriously harm the internal market and trade within the Union. We advocate a common EU control on the intentionally added PFASs in paper and board packaging entering the European Union.

Given the uncertainty of the volume of the intentionally added PFASs in paper and board packaging entering the European Union it is necessary to better understand how this will interfere with the transitional period and the proposed period of entering into force of the restriction proposal for paper and board. As stated this does not effect the intentionally added PFASs but it concerns the unintentionally presence of PFAS in recycled paper.

In paper recycling the coated/printed materials need to be correctly collected, sorted and recycled. In the EN643 the paper recycling streams are clearly defined. In a harmonised approach the recycling of food contact paper packaging materials need to be clean and dry and largely free of product residue, liquids and materials other than paper.

In food and feed packaging PFASs are intentionally applied to paper and board. The PFAS in packaging is used to repel fat, but also stains and water. This repellence function makes it in combination with the too much oil, grease and water not suitable for recycling. The Food contact articles such as thermal paper, wet-proof and/or greaseproof impregnated are generally not allowed in the paper recycling and should be disposed in the residual waste in the Netherlands (PRN Paper Separation Guide 2023). However in the submitted overview of PFAS concentrations (table 1) in Paper and Board streams it is clear given the nature of the recycling process, that's PFAS's likely to be found in recycled paper.

To control, the potential unintentional presence of PFAS due to contamination the recycled paper, the restriction on the intentionally added PFASs is the first step. But the average lifetime of food packaging can be assumed to be around one year based on information on plastic packaging (Conversio, 2018), but it could be higher for other applications such as cupcake forms. Furthermore the effect of import in the European Union on the concentrations of PFASs in paper and board packaging is unknown.

To have an estimated of the time period needed to phase out of PFASs in the Paper and Board cycle, in order to meet the limits of the REACH restriction, a number of assumptions are made in the calculation below.

In figure 1 a conceptual representation of the recycling cycle is presented to illustrate European paper recycling.

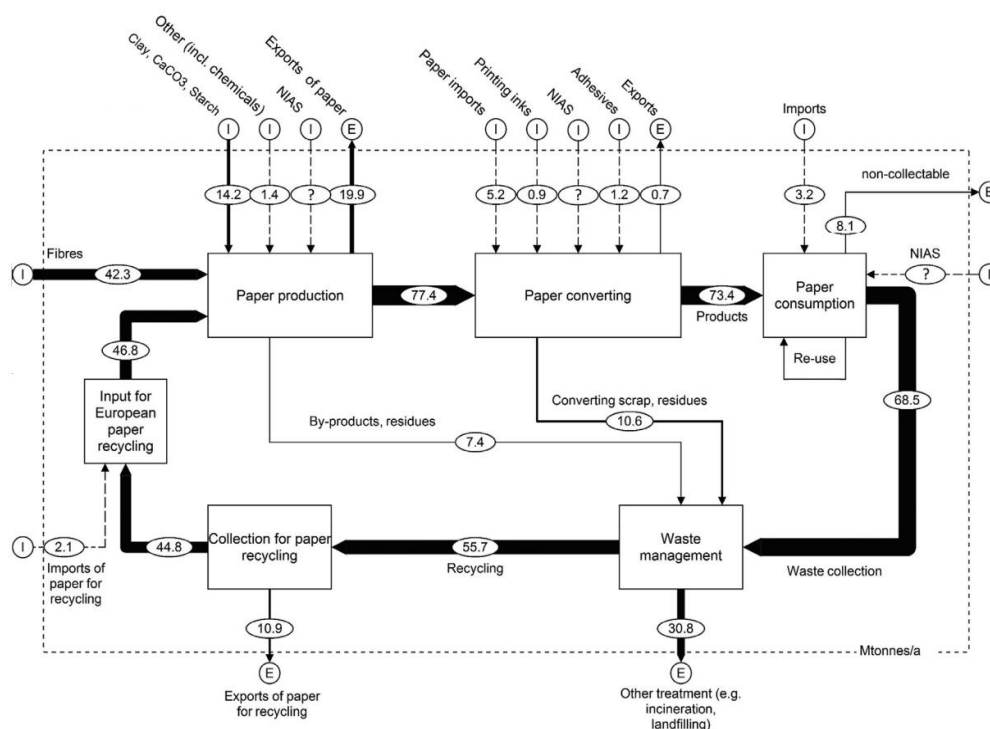


Figure 1: Conceptual model of the recycling cycle of paper and board

At this point it is not fully clear which range of PFAS concentrations are to be expected in the product of the Dutch paper industry (paper and board rolls) and thus how conclusions can be drawn about the time needed to phase out PFASs in recycled paper. Yet, a rough estimate of the phasing out time is calculated for two different scenario's or starting points;

a reasonable guess of the average PFAS concentration in paper and board, and a more worst case scenario.

Based upon the fact that the input for recycling is a mix of multiple former paper products, and the fact that food contact materials are banned from recycling, a reasonable, preliminary estimate could be that the concentration of individual PFAS is less than 100 µg/kgdw, or less than 1.000 µg/kgdw for the sum of PFAS. As said earlier, it may very well be that concentrations are already below the REACH Thresholds.

The first scenario requires a reduction in the concentration of PFAS with a factor of 4 in order to arrive below the REACH thresholds. The second scenario is a more worst-case scenario with concentrations that are 10 times higher, that require a reduction of concentrations of a factor of 40.

Additionally, the assumptions listed below are used for the calculations of the phase out time.

A conservative assumption that no PFASs enter or leave the cycle other than the outflow of non-recycled material (replaced by fresh fibres).

In the Netherlands approximately 90% of all paper is recycled, whereas it is assumed that in Europe this is at least 70%. Every cycle 10% (NL) or 30% (EU wide) of virgin fibres are added.

In figure 2 above this percentage is approximately 50%. This is however an outdated number, currently recycling rate is improved. PFASs have been phased out in the production process of paper mills. Paper is recycled 3 times a year, both in the Netherlands as in Europe.

These assumptions lead to rough estimates as presented in table 2.

Area	NL	EU
Recycling%	90%	70%
cycles/year	3	3
4x reduction (years needed)*	4,5	1,3
40x reduction (years needed)**	11,7	3,5

* This corresponds to a reduction from 100 µg/kgds to 25 µg/kgds or a 1.000 to 250 µg/kgds

**This corresponds to a reduction from 1.000 µg/kgds to 25 µg/kgds or a 10.000 to 250 µg/kgds

Table 2 contains the outcome of a calculation. This not a precise estimate. The numbers represent an exercise to obtain an impression of the timeframe it may take to phase out PFAS in case it is found in relevant concentrations in the paper recycling process.

A more appropriate assumption would be that it may take 5 to 10 years to comply with the REACH proposal in the Netherlands and 1-4 years in the European Union, whereas we expect that this may be closer to the lower boundary because food contact articles such as thermal paper, wet-proof and/or greaseproof impregnated packaging are generally not allowed in the recycling stream and are expected to contain most PFAS. This means that paper and board products that are likely to contain the highest concentrations of PFASs (FCMs) don't enter the recycling cycle. Furthermore, in the Netherlands a ban is in use PFAS substances in all paper and board food contact materials as of July 1st, 2022. As a result PFAS levels in food contact materials should go down. Unfortunately, little is known about the content in imported paper and board food contact materials.

It must be stressed that the estimates above highly depend upon the starting concentration in the calculation. Therefore, other numbers for the PFAS concentrations in the current paper and board products will directly influence the estimated phase out time. It is recommended to more accurately analyse the products of Dutch paper and board mills on PFASs.

Given the uncertainties we ask for a derogation for recycled paper of at least 5 years on top of the 18 months regular introduction period. Currently too little is known on the actual PFAS content of paper and Board and the recycling process. This concerns both known PFASs as the more unknown and/ or "invisible" compounds. Significantly more time is needed to create a reliable dataset on the process of paper production.

In the Netherlands the paper and board industry has achieved an high level of recycling, which has the disadvantage that it will take longer to phase out PFAS. Within the circular economy it is considered counterproductive to decrease the level of recycling.

Dependent upon the factual PFAS level today in produced paper, rough estimates indicate that it may take 5 years or even more to lower the levels to the maximum concentrations of REACH.

Furthermore we ask for more detailed guidelines on what, how and where to measure PFAS. These should be pragmatic guidelines regarding size (cost), detection levels and how to deal with the "hidden" PFAS. The usual target analyses most probably will not reveal significant problems, but if FTOH or PAPs are analysed for, it is uncertain whether the individual components or the sum of these will fall within the REACH boundaries.