

September 22, 2023

Non-confidential comments for Annex XV restriction report: Appendix E4

Dear Madame or Sir,

We welcome the opportunity to provide input on the restriction proposal regarding per- and polyfluoroalkyl substances (PFAS). This submission was prepared by Dr. Dorte Herzke, Prof. Rainer Lohmann and Prof. Xenia Trier with input of members of the [Global PFAS Science Panel](#) (GPSP). The GPSP is a collaborative partnership among academic researchers, regulatory scientists and policy analysts dedicated to enhancing understanding of PFAS and to protecting human and environmental health from potentially adverse effects associated with PFAS through better informed decision-making. The scientific work of the GPSP in the last five years has considerably advanced the understanding of PFAS and the GPSP would like to take the opportunity to also give input to the PFAS restriction proposal.

We see the restriction proposal as a very important initiative and good way forward to counteract the ongoing emissions of PFAS in Europe (and in part even worldwide). Our submissions should therefore be seen as a support of the restriction proposal to make it even stronger and more fully complete.

The current submission is on Specific Information Request topic 10, on Analytical methods (Annex E, Appendix E4). As requested, this comment is adding supplemental information to the collected information and methods.

In the following we suggest the use of certain methods identified in Appendix E4 for certain matrixes now lacking any methods as well as a list of additional methods to be included in the Human biomonitoring sheet of Appendix E4. In general, it can be said that many of the existing methods could be applied across matrices, if needed. A copy of the revised Appendix E4 is attached.

1) Lacking analytical methods for the matrix “Medical”

Medical equipment as tubing, containers, textile etc., either for one-time use or reusable, can be analysed for PFAS by applying the methods mentioned for Matrix “Consumer products” for solid products. For liquid products selected methods from the AFFF matrix can be applied. We added suitable references from these matrices in the attached revised version of Appendix E4, “rest_pfas_appendix_e4_31103_en_revised.xls”

Further the following reference on PFAS in Facemasks is suggested to add:

Muensterman, D. J.; Cahuas, L.; Titaley, I. A.; Schmokel, C.; De la Cruz, F. B.; Barlaz, M. A.; Carignan, C. C.; Peaslee, G. F.; Field, J. A. Per- and Polyfluoroalkyl Substances (PFAS) in Facemasks: Potential Source of Human Exposure to PFAS with Implications for Disposal to Landfills. *Environ. Sci. Technol. Lett.* **2022**, 9 (4), 320–326.
<https://doi.org/10.1021/acs.estlett.2c00019>.

2) Lacking analytical methods for the matrix “Flame retardants”

Items belonging to the category “Flame retardants” can be analysed by selected methods mentioned for matrix “Firefighting foams”. We added the suitable references from other matrices in a revised version of Appendix E4, “rest_pfas_appendix_e4_31103_en_revised.xls”

3) Lacking reference for the matrix “Firefighting foams”

The following reference is lacking and was added to the revised version of the Appendix E4.

HERZKE, D., OLSSON, E. & POSNER, S. 2012. Perfluoroalkyl and polyfluoroalkyl substances (PFASs) in consumer products in Norway - a pilot study. *Chemosphere*, 88, 980-7.

4) Missing reference for “Human biomonitoring”

Under the excel sheet for “Human biomonitoring” general methods for the routine target analyses of PFAS are lacking. Only methods for sum-parameters or experimental methods not used on a wide scale are listed so far. In 2017, an initiative was started under the acronym HBM4EU that has brought together scientists from 30 countries and the European Environment Agency to coordinate and advance human biomonitoring in Europe. PFAS were among the prioritized groups of compounds resulting in a comprehensive effort in harmonization methods for both sampling, chemical analyses and data treatment.

The following references reflect the outcome for recommended analytical methodology for PFAS:

1)

VORKAMP, K., CASTANO, A., ANTIGNAC, J. P., BOADA, L. D., CEQUIER, E., COVACI, A., ESTEBAN LOPEZ, M., HAUG, L. S., KASPER-SONNENBERG, M., KOCH, H. M., PEREZ LUZARDO, O., OSITE, A., RAMBAUD, L., PINORINI, M. T., SABBIONI, G. & THOMSEN, C. 2021. Biomarkers, matrices and analytical methods targeting human exposure to chemicals selected for a European human biomonitoring initiative. *Environ Int*, 146, 106082.

2) This reference describes both the findings of PFAS in HBM and outlines future needs for how to generate data on PFAS in HBM:

Uhl M, Schoeters G, Govarts E, Bil W, Fletcher T, Haug LS, Hoogenboom R, Gundacker C, Trier X, Fernandez MF, Calvo AC, López ME, Coertjens D, Santonen T, Murínová ĽP, Richterová D, Brouwere K, Hauzenberger I, Kolossa-Gehring M, Halldórsson Pl. PFASs: What can we learn from the European Human Biomonitoring Initiative HBM4EU. *Int J Hyg Environ Health*. 2023 May;250:114168. doi: 10.1016/j.ijheh.2023.114168. Epub 2023 Apr 15. PMID: 37068413.

We added suggestions for references in the revised version of Appendix E4.

5) Missing reference for “Environmental”

A just recently published method applying ¹⁹F NMR on the screening and identification of unknown PFAS was lacking in Appendix E4. It is added to the revised version of the Appendix.

GAUTHIER, J. R. & MABURY, S. A. 2023. Identifying Unknown Fluorine-Containing Compounds in Environmental Samples Using ¹⁹F NMR and Spectral Database Matching. *Environmental Science & Technology*, 57, 8760-8767.