

SECTION III. Non-confidential comments

It is possible to provide both general comments on the Annex XV restriction report subject to this Consultation and answers to the specific questions posed. In both cases, it is necessary to provide supporting evidence to allow ECHA's Committees to take your comments into account. It is important not to leave the submission of any socio-economic information until the consultation on SEACs opinion but already submit relevant comments at this stage.

General Comments

Select the relevant boxes that cover the content of your comments and provide your non-confidential comments below, (maximum 63 999 characters)

* I understand that it is my responsibility not to include confidential information in responses to general comments and in any responses to requests for specific information (e.g. company name, email addresses, phone numbers, signatures etc.). ECHA will not be held liable for any damages caused by making non confidential responses publicly available.

Please provide your general comments in the box below

- CEWEP is the umbrella association of Operators of European Waste-to-Energy (WtE) Plants and represents more than 80% of the WtE capacity in Europe. WtE or waste incineration with energy recovery thermally treats residual household and similar waste that cannot be recycled in a sustainable way, whilst generating energy and recovering materials. CEWEP's members are committed to ensuring high environmental standards, achieving low emissions and maintaining state of the art technologies. Thus, the WtE sector treats polluted substances in an environmentally sound way, making WtE a key component in achieving zero pollution as it prevents contaminated waste from harming human health, the environment and recycling chains. ... CEWEP's feedback will focus mainly on the questions related to the waste phase but will also touch upon the challenges of being an unintentional user of PFAS. As operators of WtE plants, CEWEP would like to point out that preventing and controlling pollution in the waste phase needs a dedicated approach, that may not be entirely consistent with the one used in this restriction proposal. Studies and investigations linked to the behaviour of PFAS in the different waste treatment processes are needed, alongside a better understanding of their impact on the environment and eventually human health. A holistic approach to the PFAS issue is needed. Precautionary principle on the one hand should be balanced with scientific knowledge, availability or lack of best available techniques and analytical options on the other. As an example, grouping PFAS together when we are assessing environmental and health risks can create a situation where hazard/toxicity of individual PFAS is overlooked and therefore their impacts are not evaluated properly.,

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.

* Compulsory Fields

I have information on this topic

I don't have information on this topic

2:Emissions in the end-of-life phase: The environmental impact assessment does not cover emissions resulting from the end-of-life phase. To get a better understanding of the extent of the resulting underestimation, (sub-)use-specific information is requested on emissions across the different stages of the lifecycle of products, i.e. the manufacture phase, the use phase and the end-of-life phase. Please provide justifications for the representativeness of the provided information. In particular:

- a. Please provide, at the (sub-)use level, an indication of the share of emissions (as percentages) attributable to these three different stages. An indication of annual emission volumes in the end-of-life phase at sector or sub-sector level would also be appreciated.
- b. If possible, please provide for each (sub-)use what share of the waste (as percentages) is treated through incineration, landfilling and recycling. Please provide information to justify the estimates as well as information on the form of recycling referred to.

* Compulsory Fields

I have information on this topic

I don't have information on this topic

3:Emissions in the end-of-life phase: With respect to waste management options, additional information is requested on the effectiveness of incineration under normal operational conditions (for different waste types, e.g. hazardous, municipal) with respect to the destruction of PFAS and the prevention of PFAS emissions.

* Compulsory Fields

I have information on this topic

I don't have information on this topic

- The sector acknowledges that PFAS are an emerging pollutant for which a number of issues are still to be investigated and this poses several challenges linked to how large the family of PFAS is and how heterogeneous they are in terms of potential behaviour and health/environmental hazard. For example, degradation of PFAS can happen at a broad range of temperatures (1), from 200°C until 1400°C, depending on the nature of their C-F bond and specifically on the length of their chain. Examples can be found in the reference (2). The temperature parameter is often brought up during discussion on the suitability of waste incineration (WtE, incineration with energy recovery) for low content PFAS waste. It is therefore important to note that the combustion efficiency of WtE processes is not solely dependent on temperature, but on the interaction of the following 3 parameters: temperature, residence time and turbulence. Other components present in the input waste can also positively influence the combustion process, e.g. the presence or addition of Hydrogen and CaO enables destruction at lower temperatures (3).

(1) Xiao et al. (2020) Thermal Stability and Decomposition of Perfluoroalkyl Substances on Spent Granular Activated Carbon

(2) Luo Y. R. (2007). Comprehensive handbook of chemical bond energies. CRC Press, Taylor & Francis Group. National Institute of Standards and Technology. Table 5 - Homolytic bond dissociation energies for fluorinated compounds:

The degradation temperature of e.g. C₈F₁₇-C(O)OH starts at already 200°C and 99% of the substance is composed at 2 seconds residence time at 350°C. For other components such as CF₃-F / CF₃-CF₃ / C₈F₁₇ - SO₂OH and C₃F₇ - SO₂OH the starting degradation temperature is respectively 1100 / 750 / 450 and for 99% decomposition at 2 seconds residence time it is 1380 / 930 / 600.

(3) Riedel et al. (2021) Low temperature thermal treatment of gas-phase fluorotelomer alcohols by calciumoxide

- With the tools that are currently available (please see reply to question 10), the sector is open to understanding and quantifying its contribution towards safe treatment of low content PFAS waste (e.g. municipal solid waste and similar waste), following the principles of EU POP regulation (4) and Best Available Techniques. Using the limited analytical options available, investigations performed recently on bottom ash showed that concentrations are either similar to background levels observed in Europe (5) or below the detection limit; some measuring campaigns done on flue gas have shown that concentrations are very low (in the range of nanograms per m³) and can also be below the limit of detection of some measuring methods (in the case of air samples measured with methods such as OTM45 – see reply to question 10 for more insights on the challenges of analytics).

For supporting data, please refer to data on ‘Emissions to air’ and ‘PFAS analysis of solid residues’

(4) Regulation (EU) 2019/1021 Art.7.2 Notwithstanding Council Directive 96/59/EC (24), waste consisting of, containing or contaminated by any substance listed in Annex IV to this Regulation shall be disposed of or recovered, without undue delay and in accordance with Part 1 of Annex V to this Regulation, in such a way as to ensure that the POP content is destroyed or irreversibly transformed so that the remaining waste and releases do not exhibit the characteristics of POPs.

(5) For supporting arguments please refer to the data on 'Composting' which can be regarded as a reference for background levels.

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:

- a. The impacts that the concentration limits proposed in paragraph 2 of the proposed restriction entry text (see table starting on page 4 of the summary of the Annex XV restriction report) have on the technical and economic feasibility of recycling processes (together with a clear indication on the waste streams to which the described impacts relate).
- b. The measures that recyclers would need to take to achieve the proposed concentration limits.
- c. The costs associated with these measures.

* Compulsory Fields

I have information on this topic

I don't have information on this topic

- CEWEP believes that at this stage it is too early to set up a quantitative limit for recycling. The reliability and harmonisation of measuring methods does not allow for the necessary legal certainty. Measurements can be made with a number of different methods, can include a different number and type of PFAS if they are targeted analysis, can have different limit of detection and uncertainty and show a very high risk of contamination of the measurement results. The issue of limit of detection and uncertainty have a direct impact on the legal certainty of assessing compliance with a concentration limit and these aspects do not appear at all in the analysis made for the restriction dossier.

At the point where we stand, even though the sector has performed a number of analyses, it would not even be possible to say if the limit of 250 ppb or 50 ppm can be met due to limitation in the analytics and heterogeneity of the waste. When the EU will have a standardised measurement framework for PFAS a discussion on quantitative limits will be possible.

Details on measurement campaigns made by CEWEP members for PFAS in residues of the WtE process and heterogeneity amongst measuring methods are shown in the table ('Overview of methodologies and measurements in residues') with the associated limit of detections. The different sampling and extraction methods, differences in laboratory equipment and contamination throughout the determination process significantly undermine the comparability of data and add to the uncertainty of each measurement.

5:Proposed derogations – Tonnage and emissions: Paragraphs 5 and 6 of the proposed restriction entry text (see table starting on page 4 of the summary of the Annex XV restriction report) include several proposed derogations. For these proposed derogations, information is requested on the tonnage of PFAS used per year and the resulting emissions to the environment for the relevant use. Please provide justifications for the representativeness of the provided information.

* Compulsory Fields

I have information on this topic

I don't have information on this topic

6:Missing uses – Analysis of alternatives and socio-economic analysis: Several PFAS uses have not been covered in detail in the Annex XV restriction report (see uses highlighted in blue and orange in Table A.1 of Annex A of the Annex XV restriction report). In addition, some relevant uses may not have been identified yet. For such uses, specific information is requested on alternatives and socio-economic impacts, covering the following elements:

- a. The annual tonnage and emissions (at sub-sector level) and type of PFAS associated with the relevant use.
- b. The key functionalities provided by PFAS for the relevant use.
- c. The number of companies in the sector estimated to be affected by the restriction.
- d. The availability, technical and economic feasibility, hazards and risks of alternatives for the relevant use, including information on the extent (in terms of market shares) to which alternative-based products are already offered on the EU market and whether any shortages in the supply of relevant alternatives are expected.
- e. For cases in which **alternatives are not yet available**, information on the status of R&D processes for finding suitable alternatives, including the extent of R&D initiatives in terms of time and/or financial investments, the likelihood of successful completion, the time expected to be required for substitution (including any relevant certification or regulatory approvals) and the major challenges encountered with alternatives which were considered but subsequently disregarded.
- f. For cases in which **substitution is technically and economically feasible** but more time is required to substitute:
 - i. the type and magnitude of costs (at company level and, if available, at sector level) associated with substitution (e.g. costs for new equipment or changes in operating costs);
 - ii. the time required for completing the substitution process (including any relevant certification or regulatory approvals);

- iii. information on possible differences in functionality and the consequences for downstream users and consumers (e.g. estimations of expected early replacement needs or expected additional energy consumption);
 - iv. information on the benefits for alternative providers.
- g. For cases in which **substitution is not technically or economically feasible**, information on what the socio-economic impacts would be for companies, consumers, and other affected actors. If available, please provide the annual value of EU sales and profits of the relevant sector, and employment numbers for the sector.

* Compulsory Fields

I have information on this topic

I don't have information on this topic

7: Potential derogations marked for reconsideration – Analysis of alternatives

and socio-economic analysis: Paragraphs 5 and 6 of the proposed restriction entry text (see table starting on page 4 of the summary of the Annex XV restriction report) include several potential derogations for reconsideration after the consultation (in [square brackets]). These are uses of PFAS where the evidence underlying the assessment of the substitution potential was weak. The substitution potential is determined on the basis of i) whether technically and economically feasible alternatives have already been identified or alternative-based products are available on the market at the assumed entry into force of the proposed restriction, ii) whether known alternatives can be implemented before the transition period ends (taking into account time requirements for substitution and certification or regulatory approval), and iii) whether known alternatives are available in sufficient quantities on the market at the assumed entry into force to allow affected companies to substitute.

A summary of the available evidence as well as the key aspects based on which a derogation is potentially warranted are presented in Table 8 in the Annex XV restriction report, with further details being provided in the respective sections in Annex E.

To strengthen the justifications for a derogation for these uses, additional specific information is requested on alternatives and socio-economic impacts covering the elements described in points a) to g) in question 6 above.

* Compulsory Fields

I have information on this topic

I don't have information on this topic

8: Other identified uses – Analysis of alternatives and socio-economic analysis:

Table 8 in the Annex XV restriction report provides a summary of the identified sectors and (sub-)uses of PFAS, their alternatives and the costs expected from a ban of PFAS. More details on the available evidence are provided in the respective sections in Annex E.

For many of the (sub-)uses, the information on alternatives and socio-economic impacts was generic and mainly qualitative. In particular, evidence on alternatives was inconclusive for some applications falling under the following (sub-)uses: technical textiles, electronics, the energy sector, PTFE thread sealing tape, non-polymeric PFAS processing aids for production of acrylic foam tape, window film manufacturing, and lubricants not used under harsh conditions.

More information is needed on alternatives and socio-economic impacts to conclude on substitution potential, proportionality, and the need for specific time-limited derogations. Therefore, specific information (if not already included in the Annex XV restriction report or covered in the questions above) is requested on alternatives and socio-economic impacts covering the elements listed in points a) to g) in question 6 above.

*** Compulsory Fields**

I have information on this topic

I don't have information on this topic

For what concerns production phase, CEWEP would like to highlight that HFC/HFO refrigerant blends used in district heating/cooling will be severely impacted by the restriction proposal as it is (specifically R134a, R143a and the HFOs R1234yf, R1234ze(E), R407C and R410 A). Nordic District heating and cooling grids operates normally with a higher temperature (+90 degrees) than often found elsewhere and there are no stable and well-functioning alternatives to PFAS based refrigerant blends working within this temperature range. The non-fluorinated refrigerants currently available (R-717, R-744 and R-290) are not considered as viable alternatives due to low efficiency, safety concerns (R-290), very high energy consumption (R-717) and emissions (R-744, R-290). (1) (2) Please note, for a more in-depth data analysis we refer to the sectorial inputs provided e.g. by the European Partnership for Energy and the Environment (EPEE).

A heat pump for large-scale production of district heating and cooling has high availability, is well monitored and has a long lifetime, up to 50 years if well maintained. Over the last decades, the Nordic countries have invested in and developed robust district heating networks dependent on large-scale heat pumps to make use of excess heat sources, such as waste, sewage, and data centres.

As there are currently no viable alternatives, a potential ban on PFAS based refrigerant blends could jeopardise the last decades' work, by moving more of the heat production towards less efficient and less climate friendly fossil and electric boilers. Replacing existing equipment will also lead to large additional costs and could endanger the profitability of district heating companies, who operate with

low margins and long horizons when making their investments decisions. It furthermore creates obstacles for Europe's nascent carbon capture and storage (CCS) industry, as projects in the bioenergy and waste-to-energy sector are planning to capture the excess heat and feed it into the district heating system with the help of industrial-scale heat pumps.

As already contemplated in the table starting on page 4 of the summary of the Annex XV restriction report a derogation of at least 12 years and at maximum the remaining lifetime of existing heat pump installations should be granted for this specific application. Derogation permits must be granted and supervised by a competent authority and renewed every five years, while operators implement a monitoring system in the transitional period to avoid PFAS leakages from district heating and cooling installations. This option would also help to go towards a level playing field within the heating and cooling market: in fact, the proposed unlimited time derogation for heating, ventilation, air conditioning, and refrigeration (HVACR) equipment installed in buildings, will create a market distortion in favour of less societal beneficial and decentralised heating and cooling solutions.

(1) Comparison of contribution to smog formation HFCs/HFOs and HCFOs and R-290; available at <https://www.fluorocarbons.org/environment/environmental-impact/vocs-and-pocps/>

(2) EC split air conditioning report by the European Partnership for Energy and the Environment (EPEE), available at <https://epeeglobal.org/wp-content/uploads/2021/12/EPEE-JBCE-JRAIA-position-paper-on-EC-split-air-conditioning-report-17-February-2021.pdf>

9: Degradation potential of specific PFAS sub-groups: A few specific PFAS sub-groups are excluded from the scope of the restriction proposal because of a combination of key structural elements for which it can be expected that they will ultimately mineralize in the environment. RAC would appreciate to receive any further information that may be available regarding the potential degradation pathways, kinetics or produced metabolites in relevant environmental conditions and compartments for trifluoromethoxy, trifluoromethylamino- and difluoromethanedioxy-derivatives.

* Compulsory Fields

I have information on this topic

I don't have information on this topic

10: Analytical methods: Annex E of the Annex XV restriction report contains an assessment of the availability of analytical methods for PFAS. Analytical methods are rapidly evolving. Please provide any new or additional information on new developments in analytics not yet considered in the Annex XV restriction report.

* Compulsory Fields

I have information on this topic

I don't have information on this topic

- The Waste-to-Energy (WtE) sector wants to stress that harmonisation and standardisation of measuring methods for PFAS is necessary in order to allow for the scientific method to be applied and ultimately following the principles of pollution prevention and control laid down in the Industrial Emissions Directive. The EU relies on a well-established standardisation system that guarantees quality control and comparability of data. At this time, the most commonly used method to measure emissions to air in WtE plants is OTM45, which is however not standardised and has shown a number of limitations. In Flanders, VITO recently published a draft method based on OTM45 (LUC VI 003) that has been going through validation and addresses some of the vulnerabilities of OTM45 (1). The US EPA is also currently revising the method and working on additional methods that could prove useful when investigating specific aspects of PFAS and their degradation.

(1) Determination of PFAS concentration in a guided gas flow. Available at https://reflabos.vito.be/2025/LUC_VI_003.pdf and <https://emis.vito.be/en/node/269>

Short summary of known problems when measuring PFAS in air samples with OTM45:

- o Lack of repeatability observed
- o High chances of contamination during field testing and field recovery
- o High chances of contamination due to lab material (e.g. PFA tubing that can release up to several thousands of nanograms of PFAS when heated)
- o Contamination due to background concentrations of PFAS in lab location
- o Poor recoveries (extensive rinsing processes)
- o Extraction agent must be specifically adapted to matrix (difficult for waste materials)
- o Differences in polarity
- o Varying behavior during sample
- o Standard substances for measurement calibration not always available
- o Measurement falsification due to stable adsorption on surfaces
- o Difficulties in obtaining a proper procedure to clean the glassware
- o Not many laboratories available with experience in PFAS measurements and sampling

- Another example of challenges linked to the current practice of measuring PFAS in air samples is that some PFAS (such as PFTTrDA, PFNS, PFTTrDS, 10:2FTS, MePFBSA, PFDSA and others) have increased measurement uncertainty based on current expertise and progressive understanding. For ultra-short chain PFAS it has proven to be hard to get a reliable signal due to noise issues. The current practice shows that some PFAS are not de facto measurable with the necessary robustness (such as 6:2FTS, for which contaminations were identified in the medium and procedural blanks).

- As mentioned above, cross-contamination is a recurring issue that laboratories are working on addressing by including additional steps in the method (e.g. rinsing at high temperatures, rinsing with methanol and cyclohexane, etc.). At the same time, it is recognised by the EU scientific community that a non-target method may prove to be more useful in a sector where the input is heterogeneous and the composition is known only to a certain extent. However, research is at the preliminary stage and the necessary time should be provided to close the knowledge gap on PFAS (2) (3)

(2) Abovementioned Determination of PFAS concentration in a guided gas flow. Available at https://reflabos.vito.be/2025/LUC_VI_003.pdf and <https://emis.vito.be/en/node/269>

(3) Non-targeted Analysis method based on extractable organically bound fluorine (EOF) - BAM Institute Germany. Available at <https://www.bam.de/Content/EN/Paper-of-the-Month/2023/Analytical-Sciences/2023-06-13-paper-of-the-month-analytical-sciences.html>

SECTION IV. Non-confidential attachment

If needed, attach additional non-confidential information (data available in excel format, reports, etc.) below. Do not attach the same information already provided in section III here. If part of the information is confidential, please use section V to share it

Add attachment

If you would like to submit more than one document, please create a compressed archive where you include all files and upload the compressed file as attachment. Maximum file size is 20 MB.

*** I have removed/blanked the information I wish to keep/I have claimed confidential from all the attachments in section IV (e.g.: company name, company logo, personal names, email, signatures, other confidential business data).** I understand that ECHA will not be held liable for any damages caused by making the attachments publicly available.

SECTION V. Confidential Attachment

If needed, attach confidential information below (for example: studies, laboratory tests, additional contact details, business data, etc.). Do not add the same information already provided in the previous sections here. Confidential information will only be used by ECHA, including its Committees, by the Member State competent authorities and by the European Commission.

If you upload a confidential attachment, please justify the reasons for confidentiality of the information in the field below. This will facilitate ECHA's work if it receives requests for access to documents.

Upload Confidential Attachment:

Add attachment – CEWEP submitted the anonymised data on residues and composting measurements and measurements on emissions to air via a confidential attachment.

If you would like to submit more than one document, please create a compressed archive where you include all files and upload the compressed file as attachment. Maximum file size is 20 MB.

* I have the following reasons enumerated in Article 4(1) or 4(2) of [Regulation \(EC\) No 1049/2001](#) regarding public access to documents why the information submitted as confidential cannot be disclosed to persons requesting access to documents (please explain below in the commenting field those reasons; a reason could be that the protection of your commercial interests, including intellectual property, would be undermined).

No confidential information of any kind should be included: