General and Specific Comments to the Consultation on the PFAS Restriction Proposal from the European Phenolic Foam Association (EPFA)

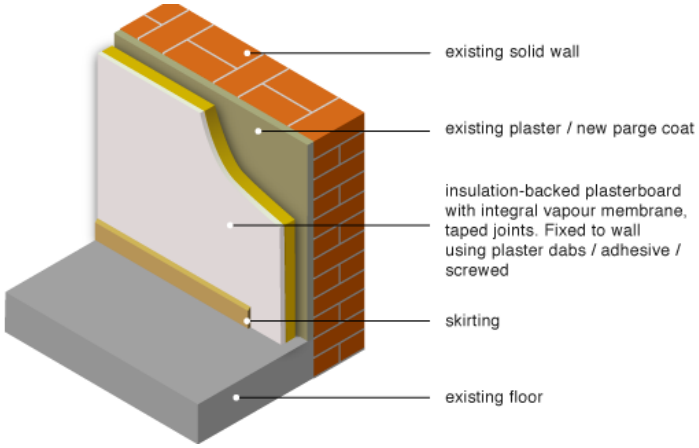
General Comments

The role of phenolic foam in optimising building energy efficiency

The European Phenolic Foam Association (EPFA) has been supporting the manufacturers of phenolic foam and their suppliers for over 30 years. The Association seeks to promote the use of phenolic foams based on their "best-in-class" thermal performance together with exceptional fire and smoke properties – all of which are pre-requisites in maximising efforts to meet the climate aspirations of the European Green Deal as it strives towards EU climate-neutrality by 2050.

Phenolic foams are a relatively small, but growing, component of the European thermal insulation market (<5%). However, they have a particularly important role in both enhancing insulation levels beyond the minimum requirements in relevant building codes based on its low thermal conductivity of 0.018–0.019W/mK. This same benefit can be leveraged to save space where the minimum requirements of those same building codes can be met using insulation with thinner sections. This space-saving feature can be of particular importance when it comes to retrofitting existing properties through the installation of additional internal linings, since the preservation of internal floor-space is a key requirement of any such policy.

With energy-related carbon emissions from buildings in 2020 representing around 35% of the total[1] and with over 80% of the buildings that will be standing in 2050 already built[2], renovation of the existing building stock is a critical component of the EU's strategy. This is well reflected in the EU's Renovation Wave initiative[3] which is targeting the deep-renovation (i.e. including the fabric of the building) of 35 million buildings by 2030. A significant proportion of the residential buildings have solid wall structures (20-30% based on location), leaving the options for increasing thermal efficiency of the building elements to either internal wall lining or external cladding, the latter being considerably more expensive than the former[4].



Even in new build properties, the value of having thinner sections of insulation is significant, since it facilitates thinner building elements overall (see graphic overleaf). This

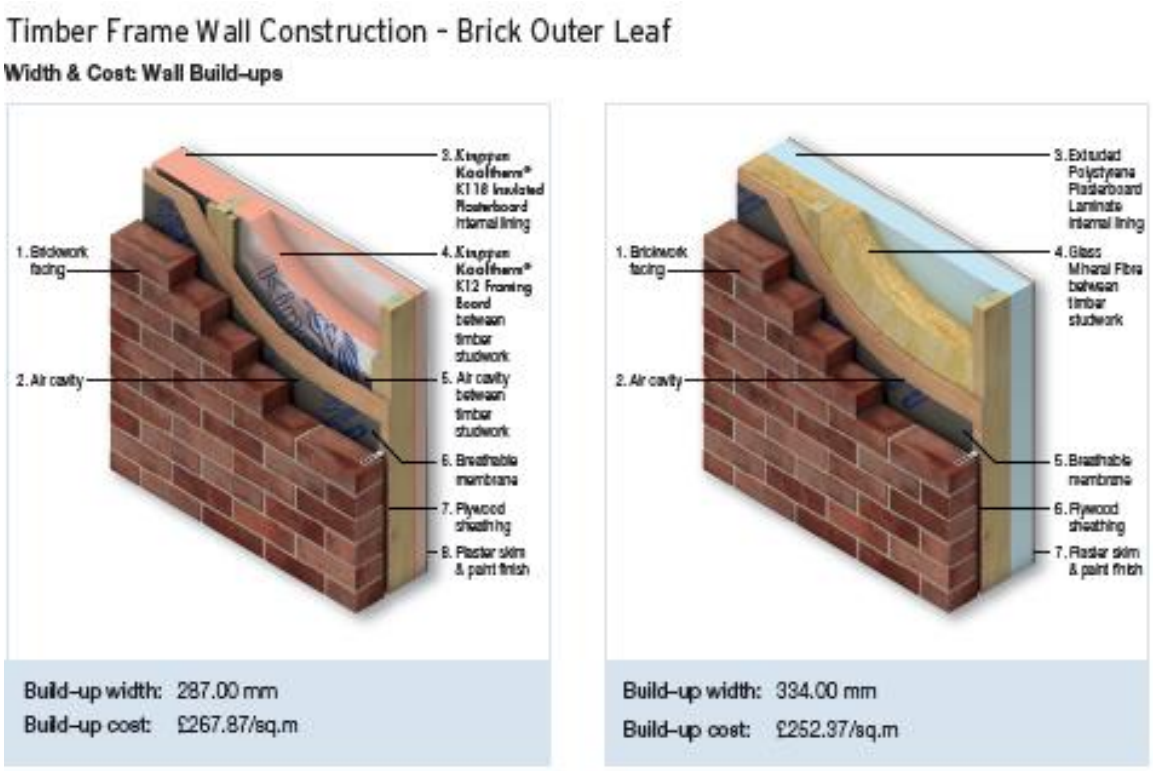
[1] https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-energy

[2] https://www.theclimategroup.org/our-work/news/energy-efficiency-measures-will-lead-way-net-zero-buildings

[3] https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

[4] https://energysavingtrust.org.uk/advice/solid-wall-insulation/#:~:text=Internal%20wall%20insulation%20is%20done,install%20than%20external%20wall%20insulation.

can have a bearing on the size of other components required in the structures of a wall, floor or roof. For example, window and door frames can be reduced in lateral dimensions leading to savings in resource use and the embodied energy that is involved in the manufacture of those components. With embodied energy in the construction sector becoming an increasing source of focus in the climate discussion as the carbon intensity of energy supplies to the build environment decreases, these are increasingly important factors.



The impacts of the potential PFAS Restriction on Phenolic Foams

The excellent thermal performance of phenolic foams is attributed in large part to the choice of a fluorinated blowing agent. F-Gases of various descriptions have been used throughout the history of phenolic foam manufacture with the latest being HCFO-1233zd(E). This particular molecule has been selected because of its excellent thermal properties, combined with very low Global Warming Potential (<5). Publicly available data demonstrates that foams blown with HCFO-1233zd(E) can achieve thermal conductivity values of 0.018-0.019W/mK. In the absence of these blowing agents, (i.e. relying on hydrocarbons of varying descriptions) the resulting thermal performance would be 0.021-0.022W/mK. Since the relationship is effectively a linear one, this would require a 10% increase in thickness to compensate and avoid additional energy loss. Whether the impact is in terms of greater thickness of insulation or lower thermal performance, it is clear that such loss of performance will be detrimental to the overall objectives of the Renovation Wave as it gathers pace.

Not only is there concern about the loss of thermal performance, but the switch from a non-flammable blowing agent to a flammable blowing agent is predicted to negate the possibility of phenolic foam products meeting Euroclass Bs1d0. The default performance level will therefore become Cs1d0, which may have an impact on the ability to use these internal lining products on renovation projects in fire sensitive areas. Since fire standards vary between Member States, it is

difficult to assess how big an impact this might have on the renovation strategies in each location, but the overall renovation challenge is simply made more difficult to surmount each time a barrier is placed on arguably the most resource-efficient of the potential solutions available.

There may also be an impact from the fire reclassification on the use of phenolic foams in building services applications such as ducting and pipe insulation, where the product also brings with it clear space-saving and construction efficiency and cleanliness benefits over competitive solutions.

EPFA notes that these potential issues have already been identified on Page 95 of the Restriction Proposal itself and also elaborated on in Section E.2.8.2.3 of Annex E. However, these arguments have seemingly failed to cut-through because of the generally held view that there are always alternative thermal insulation materials available. The reality is that such argumentation disregards the fact that renovation of existing properties will largely remain a voluntary process based on the priorities and capacities of property owners. It is likely to remain an extremely cost-sensitive subject, particularly where the building fabric is involved. Therefore, introducing further disincentives has the potential to have a disproportionate impact on renovation rates at a time when the EU needs them to be maximised.

Summary of key EPFA concerns

Representing major manufacturers of insulation materials within the EU-27, the Association would wish to make it publicly known that it believes the proposed PFAS Restriction to be disproportionate in its application to the group of fluorinated chemicals defined collectively as F-Gases. The rationale for this position can be summarised as follows:

- Global concern about the impact of PFAS is focused round the potential of substances to be both persistent and bio-accumulative (i.e. attention especially on PFOS, PFOA, PFHxS and directly related substances).
- The Annex XV Dossier submitters have argued that persistence of itself is a hazard end-point which needs managing, although the OECD (from which the Dossier submitters draw their PFAS definition) asserts that not all PFAS are hazardous.
- The F-Gases of interest to the insulation foam sector are typically HFOs/HCFOs which are not persistent themselves, with relatively short lifetimes.
- The Dossier submitters argue that, if the breakdown products are persistent, then this is sufficient to justify action.
- The main persistent breakdown product from HFOs/HCFOs is trifluoroacetic acid (TFA) and this is well known and studied by the Montreal Protocol community because of its on-going need for HFOs/HCFOs as both refrigerants and foam blowing agents which were formerly addressed where necessary by high global warming potential materials.
- The latest Report from the Environmental Effects Assessment Panel of the Montreal Protocol (EEAP - 2022) states the following: ***"based on projected future use of these precursors of TFA [incl. HFC/HFO], no harm is anticipated"*** and that TFA ***"is unlikely to cause adverse effects out to 2100"***.
- The loss of HFOs/HCFOs to the insulation foam industry has the potential to limit the availability of 'best-in-class' insulation materials that are essential to meet the objectives of the European Green Deal through such initiatives as the Renovation Wave, requiring as it does 35 million buildings to undergo deep renovation by 2030 (see sections above).

- In particular, the application of additional insulation in space-constrained and difficult-to-reach environments will be jeopardised and lead to the need for more expensive and aesthetically challenging external solutions which property owners are less likely to act upon.
- The control of emissions of F-Gases from insulation foams throughout their lifecycles is already a focus of the current F-Gas Regulation (EC517/2014) and these controls are likely to be strengthened within the revision currently under finalisation.

In conclusion, the inclusion of F-Gases as a class within the submitted PFAS Restriction proposal appears to be both unjustified and unnecessary based on the above information. The EPFA would therefore suggest the reconsideration of the inclusion of F-Gases within the scope of the proposed Restriction and, failing that, the granting of a derogation of sufficient length to allow for the conduct of a specific review of the balance of risks and benefits associated specifically with the use of F-Gases within insulating foams when assessed against alternative solutions.

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(see next page for specific comments)

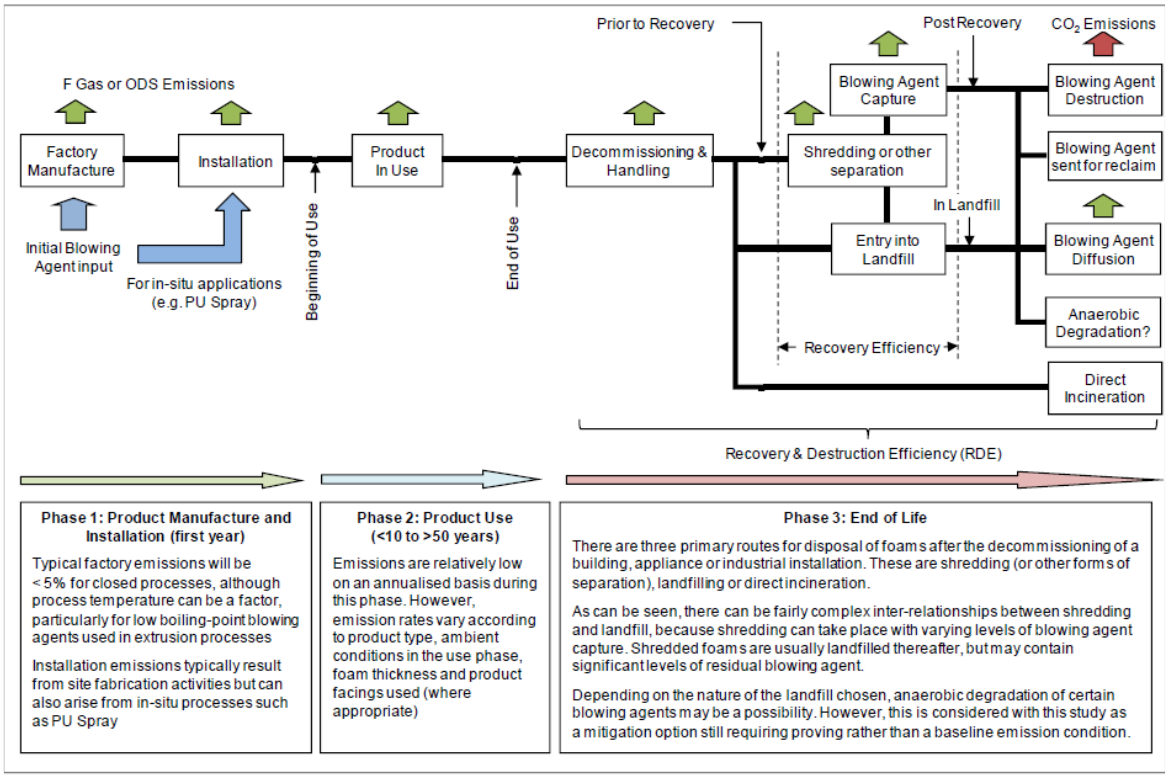
Specific Comments

1. *Sectors and (sub-)uses*

Phenolic Foam is located in the Construction Products sector with the use being F-Gases as foam blowing agents.

2. *Emissions in the end-of-life phase - Quantification*

The EPFA does not collect market statistics on the production of phenolic foam products across the EU-27, but indirect sources would suggest that no more than 300-500 tonnes of F-Gases (notably HFOs/HCFOs) are used annually in the manufacture of products. The lifecycle of a foam product is depicted in the flow-diagram diagram below[5]:



The emission rate of blowing agents from phenolic foams during the production and use phases is low and varies according to product thickness. As levels of insulation required in building codes have increased across the EU-27 over the past 20 years, the rate of loss has decreased, purely because the surface area to volume ratios have decreased and the diffusion pathways have lengthened. Even over a 50-year lifecycle, at least 40%[6] of the initial blowing agent would be expected to be present at the decommissioning stage.

[5] Extracted from SKM-Enviros Report for the European Commission entitled *'Further Assessment of Policy Options for the Management and Destruction of Banks of ODSs and F-Gases' (2012)*

[6] IPCC 2006 Reporting Guidelines – Chapter 7 – Emissions of Fluorinated Substitutes for Ozone Depleting Substances

3. *Emissions in the end-of-life phase – Waste management mitigation*

Predicting the likely demolition waste handling scenarios in 50 years' time is complex and uncertain, but segregation is expected to be more widespread by then, allowing for blowing agent recovery and either re-use or incineration of the blowing agent at that juncture. Even where current practices have involved landfilling of old foams, emission rates have been seen to be much slower than expected[7] and are typically captured and incinerated as part of the gas management process in well managed landfills.[8] Since there is a route to destruction in all of these scenarios, the end-of-life emissions are expected to be well below the total retained blowing agent at decommissioning.

4. *Impacts on the recycling industry*

Since phenolic foams are made from thermosetting polymers, any recycling that will take place is likely to come from the ground solid material or through chemical recycling. The act of chemical recycling is also likely to involve the grinding of the solid matrix as a first step, thereby allowing the separation of the blowing agent from that matrix. Therefore, the opportunity for recovery, reuse of destruction of the blowing agent will always present itself whenever recycling is undertaken.

5. *Proposed derogations – Tonnages and emissions*

EPFA proposes that a product-specific derogation be introduced to cover phenolic foams on the basis of their 'best-in-class' insulation performance and their unique role in facilitating renovations with a minimum loss of internal floorspace. The impact of such a derogation could be the subject of periodic review, where required. The Association notes that revisions within the current F-Gas Regulation are also expected to require accountability for the management of F-Gas containing foams which will ensure that there is legislative coverage on any emissions at end-of-life. Those emissions should therefore not be a justification for introducing a PFAS Restriction to manage the remaining emissions resulting from baseline consumption of less than 500tes annually.

The alternative solutions are less attractive from both a space and cost perspective and run the risk to dissuading commitments to upgrading the thermal performance of the building fabric in numerous buildings at a time when the Commission's target is already at 35 million by 2030.

6. *Missing uses – Analysis of alternatives and socio-economic analysis*

All uses of F-Gases in phenolic foams have been covered within this submission and there a no known 'missing uses'.

7. *Potential derogations marked for reconsideration – Analysis of alternatives and socio=economic analysis*

Phenolic foams have not been previously identified as being the recipient of potential derogations subject to the submission of additional data.

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

There are no other identified uses that necessarily attract focus under this submission.

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[7] Determination of the fraction of blowing agent released from refrigerator/freezer foam after decommissioning the product, Scheutz, Charlotte; Kjeldsen, Peter, Kgs. Lyngby, Denmark: Environment & Resources DTU, Technical University of Denmark, 2002

[8] California Polytechnic State University – Field Emissions of (hydro)chlorofluorocarbons and methane from a California Landfill (2016)

9. *Degradation potential of specific PFAS Sub-Groups*

Bearing in mind that HCFO-1233zd(E) is not recognised as persistent in its own right under REACH, the focus is on potential breakdown products. While trifluoroacetic acid (TFA) is recognised as the most significant of these, the EFCTC study dated 10th September 2021 and reported in the EFCTC Position paper in July 2021[9] illustrates that yields of this breakdown product are low. In addition, while the REACH Registration dossier for TFA concludes that the substance is persistent, it is neither bio-accumulative nor toxic. Accordingly, the UNEP Environmental Effects Assessment Panel (EEAP) was able to conclude in its 2022 Assessment Report[10] that *"based on projected future use of these precursors of TFA [incl. HFC/HFO], no harm is anticipated"* and that TFA *"is unlikely to cause adverse effects out to 2100"*.

10. *Analytical methods*

The Association does not have specific inputs to make on analytical methods, since these are already well-established.

European Phenolic Foam Association – September 2023

[9] https://www.fluorocarbons.org/news/published-evidence-supports-very-low-yields-of-tfa-from-most-hfos-and-hcfos/

[10] See pages 25 and 259 of the EEAP 2022 Assessment Report