

28 April 2020

Alliance for Flame Retardant Free Furniture Position Paper - *Unwanted toxic flame retardants preventing circularity and increasing fire toxicity*

Background

On the 15th of April 2020 the “Alliance for Flame Retardant Free Furniture”, issued a position paper¹ on the Circular Economy and Furniture under the title “*Unwanted toxic flame retardants preventing circularity and increasing fire toxicity*”. The Alliance declares that flame retardants are generally unnecessary, unwanted, toxic and held responsible for preventing circularity and climate goals. These allegations are without merit and not substantiated objectively in the actual paper.

General remarks

The statement “toxic flame retardants are a historical, hazardous and ineffective practice” demonstrates a poor understanding of the proven benefits of flame retardants through history and their effectiveness as a fire safety layer in society.

Flame retardants are substances that change the nature of combustible plastic materials making them more ignition resistant. In most products they primarily stop fires from starting – No Ignition No Fire. They also significantly delay flame and fire development which save lives in homes and buildings by increasing the time for occupants to escape and fire fighters to respond. It is important to understand the term ‘flame retardant’ refers to a functional role and not a particular chemistry – there are many types of flame retardants and the choice in any product design combines performance and safety from all dimensions. They offer a critical first layer of prevention in societal fire minimisation strategies and their value should not be easily dismissed.

The following comments and rebuttal address allegations made in specific sections of the Alliance’s paper.

Furniture and the Circular Economy

Flame retardants are not preventing “circularity” in the furniture sector. Furniture is a complex mix of materials which creates substantial challenges when it comes to end of life treatment and recycling. The myriad of product designs, fabrics types and cushioning foams used in furniture is the challenge not the additives used to make these products fire safe.

According to a report commissioned by the European Environmental Bureau (EEB) in 2017²: “*There is limited information on end of life treatment of furniture. Evidence suggests that on reaching its end of life, most furniture is destined for landfill. According to European Federation of Furniture Manufacturers (UEA) statistics, 80% to 90% of the EU furniture waste in MSW is incinerated or sent to landfill, with ~10% recycled*”

¹<https://safefurniture.eu/press/15-april-2020-press-release-unwanted-toxic-flame-retardants-preventing-circularity-and-increasing-fire-toxicity/>

² Eunomia, 2017. Circular Economy Opportunities in the Furniture Sector. Report on behalf of the European Environmental Bureau.

The report went on to note that *“the move away from solid wood and metal furniture to cheaper plastic, chipboard and medium-density fibreboard (MDF), particularly in flat-pack furniture, restricts the potential for a successful second life since products are often insufficiently robust to be moved easily. In addition, products are often not designed for disassembly and reassembly, or reconfiguration”*. It also noted: *“Certain waste streams, including mattresses, pose particular issues for municipalities, with no incentives to collect these items separately, and high reprocessing costs: neither landfill operators, nor providers of treatment facilities are especially keen to receive whole mattresses”*.

Finally, the report noted a general lack of producer responsibility means there is little incentive to recycle furniture or to create opportunities for enhanced re-manufacturing or reuse. Given all these challenges for circularity of the furniture sector, identifying flame retardants as a significant issue is unwarranted.

BSEF recognizes that bulky waste like furniture is an EU wide challenge that needs to be addressed in the context of the EU Circular Economy Action Plan. BSEF also notes that the Commission is currently funding a Horizon 2020 project – URBANREC³ – to find a solution to this problem. The project involves participants from six EU member states including Germany, Spain, Belgium, Poland, Portugal and France. Its goal is to help the EU achieve an 82% recycling target for bulky waste including furniture. BSEF notes that the European Furniture Industry Confederation (EFIC), a member of the Alliance for Flame Retardant Free Furniture, does not appear to be involved or a member of this important initiative.

Toxic Flame Retardants & Effects on Health

Flame retardants include a wide range of chemistries, which act in different ways, based on the chemistry and their final application. Chemical safety in products is the domain of chemical regulators and thanks to the EU REACH Regulation, all chemicals produced in Europe over 1 tonne per annum undergo extensive research and testing to ensure their safety in use. Registration under REACH is a pre-requisite to placing a new chemical FR on the market. The registration includes a detailed Chemical Safety Report (CSR) which enable the authorities to assess the safety of the chemicals for their intended uses. Oversight of the REACH Regulation is via the European Chemicals Agency (ECHA) as well as member state competent authorities.

The chemicals registered under REACH are regularly prioritized and reviewed as part of the REACH Evaluation process. On the basis of the scientific evidence from such reviews, actions are taken to manage their potential risk. Where a concern is highlighted, a full evaluation is carried out which may lead in some cases to their restriction in particular applications or even their total phase out if it is proven that they are Substances of Very High Concern (SVHC).

The mere presence of flame retardants (or other chemicals) does not mean that exposure will result in harm. The European Chemical Agency’s (ECHA) own website notes that *“the fact that an article contains a SVHC does not necessarily mean that consumers are exposed to it or that there is a risk for consumers”*.

³ URBANREC. New approaches for the valorisation of urban bulky waste into high value added recycled products. European Commission, H2020 - <https://urbanrec-project.eu/>

Finally, consumer safety is a core tenet for the entire furniture supply chain. This includes flame retardant producers, both when it comes to fire safety and chemical safety. Managing and reducing risk is key to meeting societal demands. Notwithstanding the strict regulatory requirements, industry is constantly innovating in order to respond to customers' and consumers' demands in developing new flame retardants. Emerging trends in the FR industry include chemistries that can meet the needs of a circular economy and chemistries, fully integrate into foams and fabrics and chemistries that meet robust third party evaluations like oeko-tex certification.

Toxic flame retardants and fire safety – fire toxicity

Furniture represents the biggest fuel load in a modern home. Robust fire standards for these products consider the most probable ignition events like smoking or open ignition like burning papers, space heaters etc. For these events flame retardants stop many fires as they are primarily used to stop ignition of combustible foams and plastics used in furniture. If there is no ignition, there is no fire. If there is no fire, there is no smoke. If there is no smoke, there is no smoke toxicity. However, some ignition events, other room contents on fire for example, are more significant and so a fire can still develop even in flame retarded products. In these scenarios flame retardants still provide immense value as they slow the development of these fires. This creates time for people to escape harm as well as giving firefighters more time to intervene.

Fires involving furniture develop extremely fast and the smoke from furniture fires is always toxic. Smoke toxicity is a complicated discussion but simply put all smoke is toxic. From a public safety perspective smoke toxicity often takes a back seat to the primary goal of reducing the probability and number of fires and allowing escape scenarios in ones that happen - saving people and property.

Smoke development from burning products is also an important dynamic with respect to firefighting response and repeated exposures. Flame retardants do not make smoke from furniture fires more acutely toxic for residents or fire fighters. Smoke contains multiple toxic components and gases depending on the materials being consumed. Recent research⁴ has found that smoke produced in a burning room from UK sofas (the contents of which had been treated with chemical FRs) actually produced less acutely toxic smoke based on HCN and CO emission, compared to French and US sofas. The time to toxic levels for these gases was also delayed by 15 minutes, which would allow for householders to leave the building and firefighters to combat the fire before it reached higher toxicity levels. French and US furniture used in this study generated 1200 and 1600 ppm for HCN in only 6 minutes, which are lethal levels.

The Alliance paper refers to the above study. It states it is “concerned” about such studies and then attempts to discredit the work using comments from a scientist from the University of California, Berkeley. Amongst other erroneous assertions, is the criticism lodged against the room size is non-scientific. In the actual research study, a standard ISO 9705 room was used for comparability of results for fire growth and other factors. This was also done to reduce the number of variables in testing which the scientist used by the Alliance cites. Further, the study was validated by publishing the work in a peer reviewed journal.

It appears that the Alliance scientist's views have neither been published or peer reviewed, as such they are opinions and should not be cited as authoritative.

⁴ Blais, M., Carpenter, K, and Fernandez, K. (2019). Fire Technology. <https://doi.org/10.1007/s10694-019-00888-8>

Finally, the Alliance position paper would like to convince the reader that current standards with smolder only ignition is enough for fire protection. Blais et. Al (2019, op.cit) point out clearly that this is not the case. Open flame ignition is still a hazard and the current standards in California and France (most of the EU) are insufficient. The results presented in the paper by Blais et al (2019) are in fact further supported by a recently published review of furniture fire safety regulation in Europe⁵.

The Alliance quote the work of McKenna and Hull⁶ - *“Flame Retardants in UK furniture increase smoke toxicity more then they reduce fire growth rate”* to support their assertion that flame retardants increase smoke or fire toxicity. This paper has been comprehensively critiqued by leading fire scientists including Dr. Alexander Morgan⁷ of the University of Dayton. His conclusion on this work is pertinent considering the reliance the Alliance puts on his work to support their assertions:

“To conclude, the title is not supported by the data because the full-scale experiments are not reliable. Further, the title is misleading and is exactly the sort of title that undermines the credibility of scientists everywhere. It’s attention grabbing, but not supported by the data, thus confusing the public and making them distrustful of our work. The conclusions from the cone calorimeter data are sound, as is the concept of testing actual mattresses of known composition, but the work should be withdrawn, re-tested under controlled conditions, and presented again”.

Non-toxic fire safety solutions

Concerning the alternatives fire safety solutions proposed by the Alliance, none of the solutions indicated can meet the existing stringent fire safety requirements for furniture. In fact, the Alliance suggests eliminating flame retardants, furniture fire safety standards would have to be compromised, ie, effectively lowered.

It is worth noting that no fire safety standard for furniture anywhere in the world mandates the use of flame retardants. Standards are performance based. Materials and products are required to meet fire safety performance levels, commensurate with intended use over the course of the product lifespan. Finally, fire safety standards are developed with a view to protecting life and limiting damage to property. Compliance with fire safety standards keeps people safe in their homes and prevents building and content damage.

Conclusions

The charge by the Alliance for Flame Retardant Free Furniture that flame retardants are preventing circularity of furniture is false. Similarly, the assertion that they increase fire toxicity is also false. The European furniture industry both EFIC (European Furniture Industry Confederation) and UEA (European Federation of Furniture Manufacturers), have an important challenge on their hands with respect to end of life treatment of furniture and we see encouraging signs that solutions are and will be found to enable greater reuse, reparability and recycling of furniture.

⁵ Guillaume E, de Feijter R, van Gelderen L. An overview and experimental analysis of furniture fire safety regulations in Europe. *Fire and Materials*. 2020;1–16. <https://doi.org/10.1002/fam.2826>

⁶ McKenna, S., Birtles, R., Dickens, K., Walker, R., Spearpoint, M. and Stec, A. (2018). Flame Retardants in UK furniture increase smoke toxicity more then they reduce fire growth rate. *Chemosphere*, 2018, 196, 429-439.

⁷ Morgan, A. (2018) “Response by Dr. Alexander Morgan to “Flame retardants in UK furniture increase smoke toxicity more than they reduce fire growth rate – *Chemosphere* 2018, 196, 429-439” Editorial, *Fire Science & Technology Bulletin*, March, 2018. Publishers, Hirschler & Grayson.

Fire safety is a key attribute of general public safety. Furniture fires are uniquely hazardous, and products placed on the market in the EU should be meeting the highest performance standards possible. That should be the goal. Flame retardants are important design solutions for furniture manufacturers. Their functional role – to delay ignition and prevent fire spread – is widely recognized by fire engineers, public safety managers, and manufacturers. Concerns over specific substances and their impact on human health or the environment are dealt with very effectively via strict chemical regulation and review. Trading off risks between chemical and fire safety should be avoided.

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About BSEF

BSEF – the International Bromine Council, is the global representative body for bromine producers and producers of bromine technologies. Originally founded in 1997, BSEF works to foster knowledge on the societal benefits of bromine and its applications. The members of BSEF are Albemarle Corporation, ICL Industrial Products, Lanxess and Tosoh.